

SAMPLE

TECHNICAL MANUAL OUTLINE

FOR THE

AN/SPQ-9B RADAR

CONTRACT NO. N00024-94-C-5441

CDRL SEQUENCE NO. F010

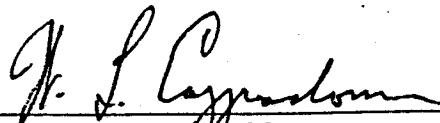
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TABLE OF CONTENTS

Section	Page
Book Plan for Chapter 1 – Introduction.....	1-1
Book Plan for Chapter 2 – Description.....	2-1
Book Plan for Chapter 3 – Operation	3-1
Book Plan for Chapter 4 – Scheduled Maintenance	4-1
Book Plan for Chapter 5 – Corrective Maintenance	5-1
Book Plan for Chapter 6 – Troubleshooting	6-1
Book Plan for Chapter 7 – Illustrated Parts Breakdown.....	7-1
Book Plan for Chapter 8 – Intermediate Level Information	8-1
Book Plan for Chapter 9 – Supplement	9-1
Appendix A – Illustration Plan	A-1
Appendix B – Samples.....	B-1
Appendix C – Table Plan.....	C-1

**BOOK PLAN
FOR
SE200-XX-MMO-010**

CHAPTER 1 – INTRODUCTION

Page Breakdown

Front Matter (for Chapters 1 – 5)	15
Text	3
*Illustrations	2
**Tabular Data	9
Estimated Total Page Count	29

*Refer to Appendix A for illustration plan and Appendix B for sample illustrations.

**Refer to Appendix C for table plan.

FRONT MATTER

Front matter for SE200-XX-MMO-010 will comprise the following data in accordance with content and format requirements of TMCR 950094-000.

Cover Set – Includes front/back covers and spine

Title Page

*List of Effective Pages

Change Record

** { Foreword
Table of Contents
List of Illustrations
List of Tables
Safety Summary including general safety precautions – will include listing with page references of all warnings/cautions in this binder

*Two column format

**Single column format

Information in the foreword will include purpose and use of this technical manual (TM) as it relates to Radar Set AN/SPQ-9B. Will describe general reporting requirements, feedback reports, TM use, error reporting and equipment modifications. In addition, will identify arrangement of manual, binder content and number of binders/TMINS numbers.

CHAPTER 1

INTRODUCTION

1.1 PURPOSE.

This paragraph will provide a brief description of Radar Set AN/SPQ-9B, its intended use and how it functions as part of the host system. Text will be supported by figure 1-1, illustrating major and ancillary units of the radar.

1.2 CAPABILITIES.

This paragraph will reference table 1-1 which will include a tabular listing of equipment operating characteristics and capabilities. Data will include: input/output signals; technical characteristics of the antenna pedestal/radome, receiver/exciter, processor, transmitter, radar set control and motor generator.

1.3 SYSTEM DESCRIPTION.

This paragraph will provide a brief non-technical description of equipment operation with external interface with a host system. Text will be supported by figure 1-2 showing equipment/external interfaces. Will briefly discuss radar modes of operation and training modes.

1.4 REFERENCE DATA.

Reference data presented in tabular form in table 1-2 will include: major units, official nomenclature and common names, reference designations, quantities per equipment, power requirements, external inputs, operating characteristics and limitations.

1.5 REFERENCE PUBLICATIONS

Table 1-3 will list publication titles and numbers of documents associated with Radar Set AN/SPQ-9B. The table will include publications covering Transmitter AN/APG-68, and the motor-generator.

Coverage of COTS items will be limited to removal and replacement. Troubleshooting and maintenance information will not be provided for COTS/GFE items in this manual.

1.6 ACRONYMS AND ABBREVIATIONS

Table 1-4 will list and describe the acronyms/abbreviations used throughout the technical manual.

**BOOK PLAN
FOR
SE200-XX-MMO-010**

CHAPTER 2 – DESCRIPTION

Page Breakdown

Text	80
*Illustrations	61
**Tabular Data	2
Estimated Total Page Count	143

*Refer to Appendix A for illustration plan and Appendix B for sample illustrations.

**Refer to Appendix C for table plan.

CHAPTER 2

DESCRIPTION

Section I. Physical Description

2.1 PHYSICAL DESCRIPTION.

This paragraph will describe significant physical features of the major units comprising the equipment. Additionally, arrangement of assemblies and subassemblies within each unit will be discussed, along with appropriate illustrations.

2.1.1 Processor. This paragraph will provide a physical description of Processor Unit 101, supported by figure 2-1. Major subassemblies comprising the unit will be described in subparagraphs with reference to the same figure.

2.1.1.1 Card Rack Assembly. Will reference table 2-1, Circuit Card Assembly (CCA)/power supply complement.

2.1.1.2 Control Display Panel.

2.1.2 Transmitter. This paragraph will provide a physical description of Transmitter Unit 102, supported by figure 2-2. Major subassemblies comprising the unit will be described in subparagraphs with reference to the same figure.

2.1.2.1 Card Rack Assembly.

2.1.2.2 Transmitter/Frame Assembly.

2.1.2.3 Power Supplies.

2.1.2.4 Circuit Breaker Panel.

2.1.2.5 Pressure Control.

2.1.2.6 Cooling and Pressurizing Components. Will describe operation of vortex coolers and fans.

2.1.3 Receiver/Exciter. This paragraph will provide a physical description of Receiver/Exciter Unit 103 supported by figure 2-3. Major subassemblies comprising the unit will be described in subparagraphs with reference to the same figure. Will reference table 2-2, CCA/module complement.

2.1.3.1 Card Rack Assembly.

2.1.3.2 Air, Surface, Beacon Modules.

2.1.3.3 Synthesizer.

2.1.3.4 Waveguide Components.

2.1.4 Antenna. This paragraph will provide a physical description of Antenna Unit 104, supported by figure 2-4. Major subassemblies comprising the unit will be described in subparagraphs with reference to the same figure.

2.1.4.1 Antenna Assembly.

2.1.4.2 Pedestal Assembly.

2.1.5 Radome. This paragraph will provide a physical description of Radome Unit 105, supported by figure 2-5.

2.1.6 Radar Set Control. This paragraph will provide a physical description of Radar Set Control Unit 106, supported by figure 2-6.

2.1.7 Motor Generator. This paragraph will provide a physical description of Motor Generator Unit 107, supported by figure 2-7.

Section II. Functional Description

2.2 GENERAL FUNCTIONAL DESCRIPTION.

The following paragraphs will provide a general functional description of overall radar operation in relation to the external interfaces. Various operational modes will be discussed, with the main emphasis on primary/on-line operation. The information will serve as continuity between the introductory data of Section I and the more detailed descriptions that follow. Reference will be made to figure 2-8 which shows main groups of signals within the radar, and signals to/from external equipment. The following hardware/software functional groups along with associated block diagrams will be included.

2.2.1 Power Distribution. Describes system power distribution and references figure 2-9.

2.2.2 Antenna Function. Describes groups comprising antenna function with reference to figure 2-10.

2.2.3 Operational Software Program. Describes operational software with relation to equipment operation. Text will reference top level operational flow diagram, figure 2-11.

2.2.4 System Timing. Describes system timing with reference to timing diagram figure 2-12 and block diagram figure 2-18.

2.2.5 Transmit Function. Describes groups comprising transmit function with reference to figure 2-14. Will include transmitter cooling and waveguide pressurization descriptions.

2.2.6 Receive Function. Describes groups comprising receive function with reference to figure 2-15.

2.2.7 Frequency Generation and Distribution. Describes generation and distribution of local oscillator frequencies and references block diagram figure 2-16.

2.2.8 Air Target Channel. Describes groups comprising air target channel and references figure 2-17.

2.2.9 Surface Target Channel. Describes groups comprising surface target channel and references figure 2-17.

2.2.10 Auxiliary Target Channel. Describes groups comprising auxiliary target channel and references figure 2-17.

2.2.11 Beacon Channel. Describes groups comprising beacon channel and references figure 2-18.

2.2.12 Video Interface Function. Describes groups comprising video interface function and references figure 2-19.

2.2.13 Versa Module Europa (VME) Function. Describes VME function and references figure 2-20.

2.2.14 Control Function. Describes control function and references figure 2-21.

2.2.15 Test Function. Describes test function and references figure 2-22.

2.2.16 Naval Tactical Data System (NTDS) Interface. Describes NTDS external interface to radar and references figure 2-23.

2.2.17 Fiber Optic Data Digital Interface (FDDI) Interface. Describes FDDI external interface to radar and references figure 2-24.

2.3 DETAILED FUNCTIONAL DESCRIPTION.

The following paragraphs will provide detailed functional descriptions of each major functional group in paragraph 2-2. Text will be supported by detailed functional block diagrams and where applicable, reference will be made to Chapter 6 supporting maintenance diagrams (summary block, power distribution and signal flow diagrams).

2.3.1 Power Distribution. This paragraph will provide an overall description of AC and DC power distribution detailed in following subparagraphs. Text will be supported by figures 2-25 and 6-34.

2.3.1.1 AC Power Distribution. Describes AC power distribution and references figures 2-26 and 6-35.

2.3.1.1.1 System Power Control. Describes application of power throughout equipment and references figures 2-27 and 6-36.

2.3.1.2 DC Power Distribution. Describes DC power distribution throughout equipment and references figures 2-28 and 6-37.

2.3.2 Antenna Function. This paragraph will provide an overall description of the antenna function detailed in the following subparagraphs. Text will be supported by figure 2-29.

2.3.2.1 Antenna Beam Selection.

2.3.2.2 Antenna Stabilization. Describes compensation of ships motion in pitch/roll axes and references figures 2-30 and 6-7.

2.3.2.3 Azimuth Drive. Describes ships heading compensation, development of azimuth reference and change pulses, and coupling of signals through slip rings and azimuth channel rotary joint. Reference will be made to figures 2-31 and 6-8.

2.3.3 Operational Software Description. This paragraph will describe program downloading, scheduler, flash memory and tracker in relation to equipment operation.

2.3.4 System Timing. This paragraph will provide an overall description of system timing detailed in the following subparagraphs. Text will be supported by figures 2-32 and 6-9.

2.3.4.1 Synchronizer/Baseband Generator. Describes generation of transmit/test target mod gates, strobes, clocks, triggers and Analog to Digital Converter (ADC) commands. Reference will be made to figures 2-33 and 6-10.

2.3.4.2 Trigger Interface. Describes generation of Coherent Dwell Interval (CDI) setup data for the synthesizers and the output triggers for external equipment. Reference will be made to figures 2-34 and 6-11.

2.3.4.3 Scheduler. Describes system real-time clock and synchronization with external equipment, and tagging CDI data and data exchanged between processors.

2.3.5 Transmit Function. This paragraph will describe development of the radio frequency (RF) transmit signal. Text will be supported by figures 2-35 and 6-12.

2.3.5.1 AN/APG-68 Transmitter. Government furnished equipment. Will provide an overview, followed by reference to AN/APG-68 technical manual.

2.3.5.2 Transmit Modulators. Describes air, surface and beacon modulators with reference to figure 2-36.

2.3.6 Receive Function. This paragraph will describe processing of the received RF signal. Text will be supported by figures 2-37 and 6-13.

2.3.6.1 RF Front End. Describes bandpass filtering, limiting, low noise amplification and RF switching. Reference will be made to figure 2-38.

2.3.7 Frequency Generation and Distribution. This paragraph will describe frequency generation and distribution. Text will be supported by figure 2-39.

2.3.7.1 Frequency Synthesis. Provides overview of the synthesizer described in following subparagraphs. Reference will be made to figure 6-14.

2.3.7.1.1 Air Synthesizer. Describes how frequency selection commands are used to combine and filter the frequency outputs from the common frequency generator in developing the air local oscillator frequency. Text will be supported by figures 2-40 and 6-15.

2.3.7.1.2 Surface Synthesizer. Describes how frequency selection commands are used to combine and filter the frequency outputs from the common frequency generator in developing the surface local oscillator frequency. Text will be supported by figures 2-40 and 6-16.

2.3.7.1.3 Common Frequency Generator. Describes development of tones used within radar. Text will be supported by figures 2-41 and 6-17.

2.3.7.2 Direct Digital Synthesis. Describes generation of test targets and Frequency-Modulated (FM) sweep signal for air and surface transmit modulators and test target assemblies. Text will be supported by figures 2-42 and 6-18.

2.3.8 Air Target Channel. Provides overall description of air channel detailed in the following subparagraphs. Text will be supported by figures 2-43 and 6-19.

2.3.8.1 Receiver. Describes amplification, filtering and limiting of RF input to generate 5 MHz output. Text will be supported by figures 2-44 and 6-20.

2.3.8.2 Analog to Digital (A/D) Conversion. Describes analog to digital conversion of 5 MHz to produce in-phase (I) and quadrature (Q) outputs. Text will be supported by figures 2-45 and 6-21.

2.3.8.3 Interface. Describes transfer of Fiber Optic (FO) drive signals to digital signal processors. Text will reference figures 2-43 and 6-22.

2.3.8.4 High Speed Crossbar. Describes operation of crossbar switch module. Text will reference figures 2-46 and 6-23.

2.3.8.5 Digital Signal Processing. Describes operation of air channel digital signal processors. Text will reference figures 2-47 and 6-24.

2.3.8.6 Track Processing. Software discussion of track processing scenario.

2.3.9 Surface Target Channel. Provides overall description of surface channel detailed in the following subparagraphs. Text will reference figures 2-43 and 6-25.

2.3.9.1 through 2.3.9.6 Text descriptions will be similar to air channel. Figure references will be the same.

2.3.10 Auxiliary Target Channel. Describes auxiliary channel. Similar to air/surface discussions but no tracking. Text will reference figure 6-26.

2.3.11 Beacon Channel. Provides overall description of beacon channel detailed in the following subparagraphs. Text will reference figures 2-48 and 6-27.

2.3.11.1 Receiver. Describes processing of received RF input to develop beacon video. Text will reference figure 2-49.

2.3.11.2 Sensitivity Time Control (STC) Attenuation. Describes STC waveform processing. Text will reference figure 2-50.

2.3.11.3 Beacon Video Generation. Describes generation of beacon output to VME bus. Text will reference figure 2-51.

2.3.12 Video Interface Function. Describes how Azimuth Change Pulse/Azimuth Reference Pulse (ACP/ARP) signals and processed data provide video and azimuth reference and change pulses to external equipment. Text will reference figures 2-52 and 6-28.

2.3.13 VME Function. Describes operation of VME repeaters and data transfer over the VME buses. Text will reference figures 2-53 and 6-29.

2.3.14 Control Function. Provides overall description of control function detailed in the following subparagraphs. Text will reference figures 2-54 and 6-30.

2.3.14.1 Serial Interface. Describes data transfer between VME buses and bit circuits. Text will reference figure 2-55.

2.3.14.2 Processor and Radar Set Control (RSC) Touch Panels. Describes panel functioning with serial interface. Text will reference figure 2-56.

2.3.15 Test Function. This paragraph will describe on and off line fault detection as part of the test function. Text will reference figures 2-57 and 6-31.

2.3.15.1 BIT Interfaces. Describes Built-In Test (BIT) interface and test points within each unit and transfer of BIT data for on/off line monitoring. Text will reference figure 2-58.

2.3.15.2 Test Target Generation. Describes generation of air, surface and beacon test targets. Text will reference figure 2-59.

2.3.16 NTDS Interface Function. Describes data transfer via VME bus to NTDS. Text will reference figures 2-60 and 6-32.

2.3.17 FDDI Interface. Describes data transfer via VME bus to FDDI local area network. Text will reference figures 2-61 and 6-33.

2.4 TRAINING MODES.

The following paragraphs will describe training modes and submodes with reference to training mode scenarios in Chapter 3, Operation.

2.4.1 Operator Training Mode. Will describe generation and use of static and dynamic air and surface test targets.

2.4.2 Test Mode. Will describe Daily System Operability Test (DSOT) for air and surface tracks, and generation of test targets for operator training.

2.4.3 Air Organic Combat System Operator/Team Training. Will describe external scenario control for operator/team training.

2.4.4 Surface Organic Combat System Operator/Team Training. Will describe external scenario control for operator/team training.

**BOOK PLAN
FOR
SE200-XX-MMO-010**

CHAPTER 3 – OPERATION

Page Breakdown

Text	10
*Illustrations	17
**Tabular Data	26
Estimated Total Page Count	53

*Refer to Appendix A for illustration plan and Appendix B for sample illustrations.

**Refer to Appendix C for table plan.

CHAPTER 3

OPERATION

3.1 GENERAL INFORMATION.

This paragraph will describe arrangement of the operating information detailed in the following subparagraphs. Discussions and explanations of each mode of operation along with its purpose and accomplishment will be described.

3.2 OPERATOR CONTROLS AND INDICATORS.

The following subparagraphs will describe operator controls and indicators located on Processor Unit 101 and Radar Set Control Unit 106.

3.2.1 Radar Control Panel (RCP). Will provide tabular listing in table 3-1 of operator controls and indicators. Listing will include: reference designation, panel designation, type of control/indicator, positions of each control, and function. Text will reference panel illustration, figure 3-1.

3.2.2 Radar Set Control Panel. Will provide tabular listing in table 3-2 of operator controls and indicators. Listing will include: reference designation, panel designation, type of control/indicator, positions of each control, and function. Text will reference panel illustration, figure 3-2.

3.2.3 Touch Screen Panels. Provides tables of controls and indicators, and associated illustrations for the RCP and RSC touch screen panels. A description of display conventions will be shown in figure 3-3. RCP and RSC main menus will reference figures 3-4 and 3-5, respectively and tables 3-3 and 3-4.

3.3 DETAILED OPERATING PROCEDURES.

This paragraph will describe the arrangement and content of the following subparagraphs.

3.3.1 System and Equipment Status. Brief statement describing system/equipment status to show relation to these detailed operating procedures for instructional use.

3.3.2 Requirements for Other Equipment. Describes operational conditions of related external equipment.

3.3.3 Special Operating Features. This paragraph will describe radar operation in the battle short and casualty modes. In addition, continued operation under interfering conditions will be described.

3.3.4 Phases of Operation. This paragraph describes content of the following subparagraphs.

3.3.4.1 Preliminary Setup. Provides procedures for initial control settings, safety requirements, application of ships power. Checklists will include normal conditions for local control and setup for maintenance switches. Reference will be made to system setup menu, figure 3-6 and table 3-5.

3.3.4.2 Turn-on Procedures. This paragraph will provide step-by-step procedures for the operator to proceed through prestandby, standby, ready, and radiate power conditions. Information will be presented in table 3-6.

3.3.4.3 Preoperational Ship Specific Data Entry/Program Load. The radar automatically performs a readiness checkout when powered up. This paragraph will provide procedures for entering ship specific data and new program loading. Reference will be made to figure 3-7 and table 3-7.

3.3.4.4 On-line BIT. The on-line BIT menu will be shown in figure 3-8. Menu descriptions will be presented in table 3-8.

3.3.4.5 Training Mode. Will provide procedure for defining and running training target scenarios. Figures 3-9/3-10 will show menus for the training target modification/scenario control. Menu descriptions will be presented in tables 3-9/3-10.

3.3.4.6 Operating Procedures. Will provide step-by-step procedures for on/off line operation. On-line (normal) operation will describe air/surface/beacon modes and modified mode (selection of Anti Ship Missile Defense [ASMD] sectors and/or surface Moving Target Indicator [MTI] sectors). In addition beacon mode selection, track-while-scan via external equipment and special track requests will be described. Touch screen panel menus/descriptions for the following modes/conditions will be shown in figures 3-11 through 3-17 and tables 3-11 through 3-17.

- operate menu figure 3-11, table 3-11

- video control menu figure 3-12, table 3-12

- radar control menu figure 3-13, table 3-13

- MTI and blank sector definition menu figure 3-14, table 3-14

- ASMD sector definition menu figure 3-15, table 3-15

- radar data menu figure 3-16, table 3-16

- beacon control menu figure 3-17, table 3-17

Will include operational modes and submodes (air, surface, beacon).

3.3.4.7 Shutdown Procedures. Describes step-by-step instructions for de-energizing the radar.

3.3.4.7.1 Normal Shutdown.

3.3.4.7.2 Emergency Shutdown.

3.3.5 Post-shutdown Procedures. Will include complete instructions for performing any operations necessary following equipment shutdown.

CHAPTER 4

SCHEDULED MAINTENANCE

4.1 INTRODUCTION.

This paragraph will reference the scheduled Maintenance Requirement Cards (MRC) and Maintenance Index Pages (MIP) prepared as part of the Preventive Maintenance System for Radar Set AN/SPQ-9B. Reference will be made to OPNAVINST 4790.4 for scheduled maintenance information and instructions for use of MRCs.

1 page of text.

**BOOK PLAN
FOR
SE200-XX-MMO-010**

CHAPTER 5 – CORRECTIVE MAINTENANCE

Page Breakdown

Text	85
*Illustrations	18
**Tabular Data	4
Estimated Total Page Count	107

*Refer to Appendix A for illustration plan and Appendix B for sample illustrations.

**Refer to Appendix C for table plan.

CHAPTER 5

CORRECTIVE MAINTENANCE

5.1 INTRODUCTION.

This paragraph will describe the purpose, scope and arrangement of organizational level maintenance data in this chapter. Will include system level alignment/adjustment procedures and removal/installation instructions for unit subassemblies – including above deck antenna items.

5.1.1 Table of established values will be provided in table 5-1.

5.1.2 Adjustment effectivity list will be provided in table 5-2.

5.2 GENERAL REPAIR PRACTICES.

Will describe subparagraphs detailing: special precautions to be followed when performing procedures described in this section; and handling of Electrostatic Discharge Sensitive (ESD) components.

5.3 ADJUSTMENT/ALIGNMENT PROCEDURES.

This paragraph will provide system level adjustment/alignment data arranged by output functions. Each procedure will include initial control settings, preliminary setup and special conditions as required. Subassembly/modules requiring adjustment have been preset at the factory; however, general adjustment techniques will be provided to improve gain, fine tune, etc., as necessary. Table 5-3 will reference the procedure, list reference designation/name of control, and troubleshooting (or parts location) diagram which shows the adjustable control.

5.4 REMOVAL/REPLACEMENT INSTRUCTIONS.

In unit/subassembly reference designation sequence, this paragraph will describe removal and replacement of organizational level maintenance items. Appropriate cautions and warnings will be provided prior to and during each procedure. General instructions for CCA removal/replacement will be provided. Table 5-4 will list interchangeable CCAs/modules by reference designation, name and part number. Instructions will be included for removal replacement of antenna subassemblies when ship is dockside, anchored or moored in calm waters.

5.4.1 Processor, Unit 101. This paragraph will describe removal/replacement of the following processor subassemblies. Text will be supported by figure 5-1.

- Tape deck
- Fan assemblies
- Synchro
- Power supplies
- Tachometer alarm

Adjustment procedures will be referenced to paragraph 5.3. Testing/checkout data will be referenced to paragraph 5.5.

5.4.2 Transmitter, Unit 102. This paragraph will describe removal/replacement of the following transmitter subassemblies. Text will be supported by figure 5-2.

- Fan assemblies
- Power supplies
- Pressure control assembly
- Servo amplifier assembly
- Transmitter AN/APG-68
- Transmitter equalizer

Adjustment procedures will be referenced to paragraph 5.3. Testing/checkout data will be referenced to paragraph 5.5.

5.4.3 Receiver-Exciter, Unit 103. This paragraph will describe removal/replacement of the following receiver-exciter subassemblies. Text will be supported by figure 5-3.

- Power supplies
- RF modules – all Line Replaceable Units (LRUs)
- BIT RF detectors

Adjustment procedures will be referenced to paragraph 5.3. Testing/checkout data will be referenced to paragraph 5.5.

5.4.4 Antenna, Unit 104. This paragraph will describe removal/replacement of the following antenna subassemblies. Text will be supported by figures 5-4 through 5-18.

- Roll and pitch gear boxes
- Synchros
- Stow pins
- Azimuth drive gear box
- Azimuth data gear box
- Rotary joints (3)
- Antenna subassembly
- Encoder
- Pedestal electronics
- Waveguide switches
- Power unit
- Power supplies
- Transmit/receive (T/R) limiters and low noise amplifiers
- Rate gyro
- Slip ring assembly
- Antenna beam switch, switch electronics, switch power supply and bypass switch

Adjustment procedures will be referenced to paragraph 5.3. Testing/checkout data will be referenced to paragraph 5.5.

5.4.5 Radome, Unit 105. This paragraph will describe removal/replacement of the radome and will include onboard repair at sea, dockside.

5.5 TESTING/CHECKOUT PROCEDURES.

This paragraph will provide procedures to verify that replaced subassemblies are functioning properly.

**BOOK PLAN
FOR
SE200-XX-MMO-020**

CHAPTER 6 – TROUBLESHOOTING

Page Breakdown

Front Matter	11
Text	6
*Illustrations	64
**Tabular Data	23
Estimated Total Page Count	104

*Refer to Appendix A for illustration plan and Appendix B for sample illustrations.

**Refer to Appendix C for table plan.

FRONT MATTER

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Title Page

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Table of Contents
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Safety Summary including general safety precautions – will include listing with page references of all warnings/cautions in this binder

*Two column format

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Information in the foreword will include purpose and use of this technical manual (TM) as it relates to Radar Set AN/SPQ-9B. Will describe general reporting requirements, feedback reports, TM use, error reporting and equipment modifications. In addition, will identify arrangement of manual, binder content and number of binders/TMINS numbers.

CHAPTER 6

TROUBLESHOOTING

Section I. Introduction

6.1 GENERAL INFORMATION.

This paragraph will describe the purpose, scope, and arrangement of the troubleshooting data contained in this chapter. Trouble isolation techniques available to maintenance personnel will also be described.

6.1.1 Sample Troubleshooting Problem. Describes sample troubleshooting problem which will show method for isolating failure to an organizational level maintenance item. Text and illustrations in this chapter will be used to isolate the failure and make repairs.

6.1.2 Use of Supporting Maintenance Data. Describes use of supporting maintenance data in Section II to troubleshoot the equipment.

Section II. Supporting Maintenance Data

6.2 TROUBLESHOOTING INDEX.

Will provide tabular listing in table 6-1 of each output function for which a troubleshooting diagram has been prepared. The index will be in alphabetical order and will reference a signal flow, ladder, or power distribution diagram.

6.3 MAINTENANCE CONTROLS AND INDICATORS.

Will describe maintenance controls and indicators located on Transmitter Unit 102. Table 6-2 will provide tabular listing of reference designation, panel designation, type of control and indicator, positions of each control, and function. Text will reference panel illustration, figure 6-1.

6.4 MAINTENANCE TURN-ON PROCEDURE.

Will expand upon the turn-on procedures of Chapter 3 to include additional steps for monitoring equipment to ensure that radar meets operability requirements. Procedure will be presented in table 6-3. Reference will be made to troubleshooting diagrams.

6.5 RELAY, SWITCH AND LAMP INDEXES.

Tables 6-4, 6-5 and 6-6 will list all relay coils, switches and lamps in each unit of the radar. Listings will be alphanumeric by reference designation. The relay index will identify functional bus and coil voltage, switch index will identify the switched bus and voltage, and lamp index will identify lamp name and bus voltage. All tables will reference the troubleshooting diagram on which the component is shown in the active state.

6.6 GENERAL TROUBLESHOOTING INFORMATION.

This paragraph will provide information to facilitate and supplement use of the troubleshooting and reference diagrams in Sections III and IV.

6.7 OFF-LINE BIT FAULT ISOLATION DATA.

Describes use of off-line BIT to isolate malfunctions to LRUs. Will reference and describe use of the following menus on the touch screen panels:

- BIT main menu figure 6-2, table 6-7
- system fault details menu figure 6-3, table 6-8
- BIT fault insertion/isolation menu figure 6-4, table 6-9

Will develop fault logic diagrams to isolate failures which the BIT has detected, but not identified.

6.8 DATA EXTRACTION (DX).

Will describe methods of extracting data using DX options, tape recorder, etc. Will reference the following control and indicator tables.

Table 6-10	Data Extraction Menu, Controls and Indicators
Table 6-11	Signal Processor DX Options, Controls and Indicators
Table 6-12	Select Processors, Controls and Indicators
Table 6-13	Processor DX Event Select, Controls and Indicators

Section III. Troubleshooting Diagrams

6.9 SUMMARY BLOCK DIAGRAMS.

This paragraph will describe purpose and use of the summary block diagrams and how they interface with the signal flow/power distribution diagrams that follow.

6.10 SIGNAL FLOW DIAGRAMS.

This paragraph will describe arrangement and use of signal flow diagrams to troubleshoot the functional circuits of the radar.

6.11 POWER DISTRIBUTION DIAGRAMS.

This paragraph will describe arrangement and use of AC/DC power distribution and power control circuits.

Section IV. Reference Diagrams

6.12 RADAR SET INTERCONNECTING CABLING DIAGRAM.

Cabling diagram, figure 6-38 will show the cabling among the units comprising radar.

6.13 UNIT/ASSEMBLY SCHEMATIC DIAGRAMS.

Unit schematic diagrams will be arranged in reference designation sequence and will show wiring between subassemblies, backplane, power supplies and chassis-mounted components. Each unit schematic will precede CCA/module schematics for that unit.

Section III. Troubleshooting Diagrams

- Figure 6-5 Radar Set AN/SPQ-9B, Summary Block Diagram
- Figure 6-6 Antenna Function, Summary Block Diagram
- Figure 6-7 Antenna Stabilization, Signal Flow Diagram
- Figure 6-8 Azimuth Drive, Signal Flow Diagram
- Figure 6-9 System Timing, Summary Block Diagram
- Figure 6-10 Synchronizer/Baseband Generator, Signal Flow Diagram
- Figure 6-11 Trigger Interface, Signal Flow Diagram
- Figure 6-12 Transmit Function, Signal Flow Block Diagram
- Figure 6-13 Receive Function, Signal Flow Diagram
- Figure 6-14 Frequency Generation and Distribution, Summary Block Diagram
- Figure 6-15 Air Frequency Synthesizer, Signal Flow Diagram
- Figure 6-16 Surface/Beacon Frequency Synthesizer, Signal Flow Diagram
- Figure 6-17 Common Frequency Synthesizer, Signal Flow Diagram
- Figure 6-18 Direct Digital Synthesizer, Signal Flow Diagram
- Figure 6-19 Air Channel, Summary Block Diagram
- Figure 6-20 Receiver, Signal Flow Diagram
- Figure 6-21 A/D Converter, Signal Flow Diagram
- Figure 6-22 Interface, Signal Flow Diagram
- Figure 6-23 High Speed Crossbar, Signal Flow Diagram
- Figure 6-24 Digital Signal Processing, Signal Flow Diagram
- Figure 6-25 Surface Channel, Signal Flow Diagram
- Figure 6-26 Auxiliary Channel, Signal Flow Diagram

- Figure 6-27 Beacon Channel, Signal Flow Diagram
- Figure 6-28 Video Interface, Signal Flow Diagram
- Figure 6-29 VME, Signal Flow Diagram
- Figure 6-30 Control Function, Signal Flow Diagram
- Figure 6-31 Test Function, Signal Flow Diagram
- Figure 6-32 NTDS Interface, Signal Flow Diagram
- Figure 6-33 FDDI Interface, Signal Flow Diagram
- Figure 6-34 Power Distribution, Summary Block Diagram
- Figure 6-35 AC Power Distribution Diagram
- Figure 6-36 System Power Control
- Figure 6-37 DC Power Distribution Diagram

Section IV. Reference Diagrams

- Figure 6-38 System Interconnecting Cabling Diagram
- Figure 6-39 Processor Unit 101, Schematic Diagram
- Figure 6-40 Video Interface, Schematic Diagram
- Figure 6-41 Receiver Interface, Schematic Diagram
- Figure 6-42 General Interface, Schematic Diagram
- Figure 6-43 Trigger Generator, Schematic Diagram
- Figure 6-44 Beacon Video Generator, Schematic Diagram
- Figure 6-45 Transmitter Unit 102, Schematic Diagram
- Figure 6-46 Transmitter Interface/BIT, Schematic Diagram
- Figure 6-47 Receiver/Exciter Unit 103, Schematic Diagram
- Figure 6-48 Direct Digital Synthesizer, Schematic Diagram
- Figure 6-49 Synchronizer/Baseband Generator, Schematic Diagram
- Figure 6-50 Processor Interface, Schematic Diagram
- Figure 6-51 Interface/BIT, Schematic Diagram
- Figure 6-52 Combiner/Transmit Test Target Generator, Schematic Diagram
- Figure 6-53 Transmit/test Target Modulator, Schematic Diagram
- Figure 6-54 Beacon Receiver, Schematic Diagram
- Figure 6-55 Surface Receiver/A to D Converter, Schematic Diagram
- Figure 6-56 Local Oscillator Distribution, Schematic Diagram
- Figure 6-57 Air Receiver/A to D Converter, Schematic Diagram
- Figure 6-58 Power Supply Assembly, Schematic Diagram
- Figure 6-59 RF Distribution, Schematic Diagram

Figure 6-60 Antenna/Pedestal Unit 104, Schematic Diagram

Figure 6-61 Pedestal Electronics, Schematic Diagram

Figure 6-62 Junction Box Assembly, Schematic Diagram

Figure 6-63 Radar Set Control Unit 106, Schematic Diagram

Figure 6-64 Motor Generator Unit 107, Schematic Diagram

**BOOK PLAN
FOR
SE200-XX-MMO-030**

CHAPTER 7 – ILLUSTRATED PARTS BREAKDOWN

Page Breakdown

Front Matter	10
Text	5
*Illustrations (Includes GAPL)	120
**Tabular Data (Includes numerical and Ref. Des. Index)	15
Estimated Total Page Count	150

*Refer to Appendix A for illustration plan and Appendix B for sample illustrations.

**Refer to Appendix C for table plan.

FRONT MATTER

Front matter for SE200-XX-MMO-030 will comprise the following data in accordance with content and format requirements of TMCR 950094-000.

Cover Set – Includes front/back covers and spine

Title Page

*List of Effective Pages

Change Record

** { Foreword
Table of Contents
List of Illustrations
List of Tables
Safety Summary including general safety precautions – will include listing with page references of all warnings/cautions in this binder

*Two column format

**Single column format

Information in the foreword will include purpose and use of this technical manual (TM) as it relates to Radar Set AN/SPQ-9B. Will describe general reporting requirements, feedback reports, TM use, error reporting and equipment modifications. In addition, will identify arrangement of manual, binder content and number of binders/TMINS numbers.

CHAPTER 7

ILLUSTRATED PARTS BREAKDOWN

7.1 INTRODUCTION.

This paragraph will describe arrangement of the Group Assembly Parts List (GAPL), numerical and reference designation indexes for units 101 through 107. Table 7-1, manufacturers codes and names will cross reference a five digit code to manufacturers name and address for items. COTS items will reference the Prime contractors code.

7.2 USABLE ON CODES.

This paragraph will describe application of the usable on code system. Table 7-2 will list and describe codes used.

7.3 CROSS-INDEXING SYSTEM.

This paragraph will describe use of the cross-indexing system to locate a part when: part number is not known; part number is known; and/or reference designation is known. An explanation and illustration of cross-indexing use will be provided.

7.4 GROUP ASSEMBLY PARTS LIST.

Will describe column arrangement of GAPL. Will consist of illustration and parts lists for organizational and intermediate level replacement parts for units 101 through 107 of Radar Set AN/SPQ-9B. Exploded view, line drawing illustrations and parts lists will be shown in figures 7-1 through 7-40.

7.5 NUMERICAL INDEX.

Numerical index will contain column listings of all GAPL part numbers. Cross reference to breakdown/index/reference designator numbers will be provided. Subparagraphs will describe each column.

7.6 REFERENCE DESIGNATION INDEX (RDI).

Reference designation index will aid in locating identifying part number and its location in the GAPL when reference designation is known. Reference designations will be cross referenced to applicable breakdown and index number and part number. Subparagraphs will describe each column.

**BOOK PLAN
FOR
SE200-XX-MMO-040**

CHAPTER 8 – INTERMEDIATE LEVEL INFORMATION

Page Breakdown

Front Matter	8
Text	15
*Illustrations	14
**Tabular Data	62
Estimated Total Page Count	99

*Refer to Appendix A for illustration plan and Appendix B for sample illustrations.

**Refer to Appendix C for table plan.

FRONT MATTER

Front matter for SE200-XX-MMO-040 will comprise the following data in accordance with content and format requirements of TMCR 950094-000.

Cover Set – Includes front/back covers and spine

Title Page

*List of Effective Pages

Change Record

** { Foreword
Table of Contents
List of Illustrations
List of Tables
Safety Summary including general safety precautions – will include listing with page references of all warnings/cautions in this binder

*Two column format

**Single column format

Information in the foreword will include purpose and use of this technical manual (TM) as it relates to Radar Set AN/SPQ-9B. Will describe general reporting requirements, feedback reports, TM use, error reporting and equipment modifications. In addition, will identify arrangement of manual, binder content and number of binders/TMINS numbers.

CHAPTER 8

INTERMEDIATE LEVEL INFORMATION

8.1 INTRODUCTION.

This paragraph will describe the scope and arrangement of intermediate level data in this chapter.

8.2 UNPACKING AND REPACKING INSTRUCTIONS.

This paragraph will provide step-by-step instructions for unpacking and repacking each unit of the radar.

8.2.1 Unpacking. Will provide instructions for unpacking below decks equipment with reference to figure 8-1; and above deck equipment with reference to figures 8-2 and 8-3.

8.2.2 Repacking. Will provide instructions for repacking all units of the radar with reference to figures 8-1 through 8-3.

8.3 INSPECTION.

This paragraph will include data which will list all items to be checked for damage, inspections to be made and disposition of damaged material. Data will be provided in table 8-1.

8.4 SITE INFORMATION.

This paragraph will describe requirements for installation such as: power, cooling, air pressure, space, maintenance accessibility operation.

8.4.1 Processor. This paragraph will describe installation requirements for the processor and will reference figure 8-4.

8.4.2 Transmitter. This paragraph will describe installation requirements for the transmitter and will reference figure 8-5.

8.4.3 Receiver-Exciter. This paragraph will describe installation requirements for the receiver-exciter and will reference figure 8-6.

8.4.4 Radar Set Control. This paragraph will describe installation requirements for the RSC and will reference figure 8-7.

8.4.5 Motor Generator. This paragraph will describe installation requirements for the motor-generator and will reference figure 8-8.

8.4.6 Antenna. This paragraph will describe installation requirements for the antenna and will reference figures 8-9 and 8-10.

8.4.7 Radome. This paragraph will describe installation requirements for the radome and will reference figure 8-11.

8.5 INSTALLATION INSTRUCTIONS.

This paragraph will provide step-by-step procedures for installing the equipment. Reference will be made to interconnection cabling diagram figure 8-12, air pressurization diagram figure 8-13, and waveguide connection diagram figure 8-14. Reference will also be made to table 8-2 cable run list.

8.6 INSTALLATION CHECKOUT.

Reference will be made to the maintenance turn-on procedure in Chapter 6.

8.6 REMOVAL OF EQUIPMENT.

This paragraph will provide instructions for dismantling the equipment and repacking for reshipment.

**SUPPLEMENT
SE200-XX-MMO-050**

CLASSIFIED DATA

Page Breakdown

Front Matter	7
Text	1
Tabular Data	1
Estimated Total Page Count	9

FRONT MATTER

Front matter for SE200-XX-MMO-050 will comprise the following data in accordance with content and format requirements of TMCR 950094-000.

Cover Set – Includes front/back covers and spine

Title Page

*List of Effective Pages

Change Record

** {
Foreword
Table of Contents
List of Illustrations
List of Tables
Safety Summary including general safety precautions – will include listing with page references of all warnings/cautions in this binder

*Two column format

**Single column format

Information in the foreword will include purpose and use of this technical manual (TM) as it relates to Radar Set AN/SPQ-9B. Will describe general reporting requirements, feedback reports, TM use, error reporting and equipment modifications. In addition, will identify arrangement of manual, binder content and number of binders/TMINS numbers.

**CONTENT
OF
SUPPLEMENT**

Data in table 9-1 of the supplement will include classified AN/SPQ-9B radar frequency, equipment parameters, range and range rates.

APPENDIX A

ILLUSTRATION PLAN

This illustration plan lists the proposed figures to be included in the AN/SPQ-9B technical manual. Figure number, title, size and type of illustration (line drawing, schematic, etc.) are included.

FIGURE NO.	TITLE	APPROX. SIZE	TYPE OF ILLUS.
1-1	Radar Set AN/SPQ-9B Major Assemblies and Ancillary Units	8-1/2 x 11	Line Drawing
1-2	Radar/System Integration Diagram	8-1/2 x 11	Line Drawing
2-1	Processor, Unit 101	8-1/2 x 11	Line Drawing
2-2	Transmitter, Unit 102	8-1/2 x 11	Line Drawing
2-3	Receiver/Exciter, Unit 103	8-1/2 x 11	Line Drawing
2-4	Antenna, Unit 104	8-1/2 x 11	Line Drawing
2-5	Radome, Unit 105	8-1/2 x 11	Line Drawing
2-6	Radar Set Control, Unit 106	8-1/2 x 11	Line Drawing
2-7	Motor Generator, Unit 107	8-1/2 x 11	Line Drawing
2-8	Radar Set AN/SPQ-9B Functional Block Diagram	11 x 17	Line Drawing
2-9	Power Distribution Block Diagram	11 x 17	Line Drawing
2-10	Antenna Function Block Diagram	8-1/2 x 11	Line Drawing
2-11	Operational Software Flow Diagram	8-1/2 x 11	Line Drawing
2-12	System Timing Diagram	8-1/2 x 11	Line Drawing
2-13	System Timing Block Diagram	8-1/2 x 11	Line Drawing
2-14	Transmit Function Block Diagram	8-1/2 x 11	Line Drawing
2-15	Receive Function Block Diagram	8-1/2 x 11	Line Drawing
2-16	Frequency Generation and Distribution Block Diagram	11 x 17	Line Drawing
2-17	Air, Surface, Auxiliary Target Channel Block Diagram	8-1/2 x 11	Line Drawing
2-18	Beacon Channel Block Diagram	8-1/2 x 11	Line Drawing
2-19	Video Interface Function Block Diagram	8-1/2 x 11	Line Drawing
2-20	VME Function Block Diagram	8-1/2 x 11	Line Drawing
2-21	Control Function Block Diagram	8-1/2 x 11	Line Drawing
2-22	Test Function Block Diagram	11 x 17	Line Drawing
2-23	NTDS Interface Block Diagram	8-1/2 x 11	Line Drawing
2-24	FDDI Interface Block Diagram	8-1/2 x 11	Line Drawing
2-25	Power Distribution Functional Block Diagram	11 x 17	Line Drawing
2-26	AC Power Distribution	11 x 17	Line Drawing
2-27	Power Control Diagram	11 x 17	Line Drawing
2-28	DC Power Distribution	11 x 17	Line Drawing
2-29	Antenna Functional Block Diagram	11 x 17	Line Drawing
2-30	Antenna Stabilization Functional Block Diagram	11 x 17	Line Drawing
2-31	Azimuth Drive Functional Block Diagram	11 x 17	Line Drawing
2-32	System Timing Functional Block Diagram	11 x 17	Line Drawing
2-33	Synchronizer/Baseband Generator Functional Block Diagram	11 x 17	Line Drawing
2-34	Trigger Interface Functional Block Diagram*	11 x 17	Line Drawing
2-35	Transmitter Functional Block Diagram	11 x 17	Line Drawing

*Re-applied engineering drawing

FIGURE NO.	TITLE	APPROX. SIZE	TYPE OF ILLUS.
2-36	Transmit Modulator Functional Block Diagram	11 x 17 (2 sh)	Line Drawing
2-37	Receive Functional Block Diagram	11 x 17	Line Drawing
2-38	RF Front End Block Diagram	11 x 17	Line Drawing
2-39	Frequency Generation and Distribution Functional Block Diagram	11 x 17	Line Drawing
2-40	Air, Surface Synthesizer Functional Block Diagram	11 x 17	Line Drawing
2-41	Common Frequency Synthesizer Functional Block Diagram	11 x 17	Line Drawing
2-42	Direct Digital Synthesizer Functional Block Diagram	11 x 17	Line Drawing
2-43	Air Target Channel Functional Block Diagram	11 x 17	Line Drawing
2-44	Receiver Functional Block Diagram	11 x 17	Line Drawing
2-45	A/D Converter Functional Block Diagram	11 x 17	Line Drawing
2-46	High Speed Crossbar Functional Diagram	11 x 17	Line Drawing
2-47	Digital Signal Processing Functional Block Diagram	11 x 17	Line Drawing
2-48	Beacon Channel Functional Block Diagram	11 x 17	Line Drawing
2-49	Beacon Receiver Functional Block Diagram	11 x 17	Line Drawing
2-50	STC Attenuator Functional Block Diagram	11 x 17	Line Drawing
2-51	Beacon Video Generator Functional Block Diagram*	11 x 17	Line Drawing
2-52	Video Interface Functional Block Diagram*	11 x 17	Line Drawing
2-53	VME Functional Block Diagram	11 x 17	Line Drawing
2-54	Control Functional Block Diagram	11 x 17	Line Drawing
2-55	Serial Interface Functional Block Diagram	11 x 17	Line Drawing
2-56	Processor/RSC Touch Panel Interface	11 x 17	Line Drawing
2-57	Test Function, Functional Block Diagram	11 x 17	Line Drawing
2-58	BIT Interface Functional Block Diagram	11 x 17	Line Drawing
2-59	Test Target Functional Block Diagram	11 x 17	Line Drawing
2-60	NTDS Interface Functional Block Diagram	8-1/2 x 11	Line Drawing
2-61	FDDI Interface Functional Block Diagram	8-1/2 x 11	Line Drawing
3-1	Local (Processor) Radar Control Panel Controls and Indicators	8-1/2 x 11	Line Drawing
3-2	Radar Set Control Panel Controls and Indicators	8-1/2 x 11	Line Drawing
3-3	Touch Screen Panel Display Conventions	8-1/2 x 11	Line Drawing
3-4	RCP Main Menu	8-1/2 x 11	Line Drawing
3-5	RSC Main Menu	8-1/2 x 11	Line Drawing
3-6	System Setup Menu	8-1/2 x 11	Line Drawing
3-7	Ship Specific Data Entry/Program Load	8-1/2 x 11	Line Drawing
3-8	On-Line BIT Menu	8-1/2 x 11	Line Drawing
3-9	Test Target Scenario Menu	8-1/2 x 11	Line Drawing
3-10	Control System Mode Menu	8-1/2 x 11	Line Drawing

*Re-applied engineering drawing

FIGURE NO.	TITLE	APPROX. SIZE	TYPE OF ILLUS.
3-11	Operate Menu	8-1/2 x 11	Line Drawing
3-12	Video Control Menu	8-1/2 x 11	Line Drawing
3-13	Radar Control Menu	8-1/2 x 11	Line Drawing
3-14	MTI and Blank Sector Definition Menu	8-1/2 x 11	Line Drawing
3-15	ASMD Sector Definition Menu	8-1/2 x 11	Line Drawing
3-16	Radar Data Menu	8-1/2 x 11	Line Drawing
3-17	Beacon Control Menu	8-1/2 x 11	Line Drawing
5-1	Processor Unit 101, Location of Subassemblies	8-1/2 x 11 (2 sh)	Line Drawing
5-2	Transmitter Unit 102, Location of Subassemblies	8-1/2 x 11 (2 sh)	Line Drawing
5-3	Receiver-Exciter Unit 103, Location of Subassemblies	8-1/2 x 11	Line Drawing
5-4	Roll Gear Box	8-1/2 x 11	Exploded View
5-5	Roll Gear Box and Gimbal Assemblies	8-1/2 x 11	Exploded View
5-6	Roll Drive Axis Total Linear Backlash Measurement	8-1/2 x 11	Line Drawing
5-7	Pitch Gear Box	8-1/2 x 11	Exploded View
5-8	Pitch Gear Box and Gimbal Assemblies	8-1/2 x 11	Exploded View
5-9	Pitch Drive Axis Total Linear Backlash	8-1/2 x 11	Line Drawing
5-10	Antenna, Synchro, Junction Box Subassemblies	8-1/2 x 11	Exploded View
5-11	Azimuth Drive Gear Box and Bearing Plate Assy	8-1/2 x 11	Exploded View
5-12	Azimuth Data Gear Box and Antenna Turntable Assemblies	8-1/2 x 11	Exploded View
5-13	Azimuth Drive Gear Box	8-1/2 x 11	Exploded View
5-14	Locating Gear on Encoder Shaft	8-1/2 x 11	Line Drawing
5-15	T/R Limiters and Low Noise Amplifiers	8-1/2 x 11	Line Drawing
5-16	Rate Gyro	8-1/2 x 11	Exploded View
5-17	Slip Ring Assembly	8-1/2 x 11	Exploded View
5-18	Antenna Beam Switch, Switch Electronics, Power Supply, Bypass Switch	11 x 17	Line Drawing
6-1	Transmitter Controls and Indicators	8-1/2 x 11	Line Drawing
6-2	BIT Main Menu	8-1/2 x 11	Line Drawing
6-3	System Fault Details Menu	8-1/2 x 11	Line Drawing
6-4	BIT Fault Insertion/Isolation Menu	8-1/2 x 11	Line Drawing
6-5	Radar Set AN/SPQ-9B, Summary Block Diagram	11 x 17	Line Drawing
6-6	Antenna Function, Summary Block Diagram	11 x 17	Line Drawing
6-7	Antenna Stabilization, Signal Flow Diagram	11 x 17 (2 sh)	Line Drawing
6-8	Azimuth Drive, Signal Flow Diagram	11 x 17	Line Drawing
6-9	System Timing, Summary Block Diagram	11 x 17	Line Drawing

FIGURE NO.	TITLE	APPROX. SIZE	TYPE OF ILLUS.
6-10	Synchronizer/Baseband Generator, Signal Flow Diagram	11 x 17 (2 sh)	Line Drawing
6-11	Trigger Interface, Signal Flow Diagram	11 x 17	Line Drawing
6-12	Transmit Function, Signal Flow Diagram	11 x 17 (2 sh)	Line Drawing
6-13	Receive Function, Signal Flow Diagram	11 x 17 (2 sh)	Line Drawing
6-14	Frequency Generation and Distribution, Summary Block Diagram	11 x 17 (2 sh)	Line Drawing
6-15	Air Frequency Synthesizer, Signal Flow Diagram	11 x 17 (2 sh)	Line Drawing
6-16	Surface/Beacon Frequency Synthesizer, Signal Flow Diagram	11 x 17 (2 sh)	Line Drawing
6-17	Common Frequency Synthesizer, Signal Flow Diagram	11 x 17 (2 sh)	Line Drawing
6-18	Direct Digital Synthesizer, Signal Flow Diagram	11 x 17 (2 sh)	Line Drawing
6-19	Air Channel, Summary Block Diagram	11 x 17	Line Drawing
6-20	Receiver, Signal Flow Diagram	11 x 17 (2 sh)	Line Drawing
6-21	A/D Converter, Signal Flow Diagram	11 x 17 (2 sh)	Line Drawing
6-22	Interface, Signal Flow Diagram	11 x 17	Line Drawing
6-23	High Speed Crossbar, Signal Flow Diagram	11 x 17	Line Drawing
6-24	Digital Signal Processing, Signal Flow Diagram	11 x 17	Line Drawing
6-25	Surface Channel, Signal Flow Diagram	11 x 17 (2 sh)	Line Drawing
6-26	Auxiliary Channel, Signal Flow Diagram	11 x 17	Line Drawing
6-27	Beacon Channel, Signal Flow Diagram	11 x 17	Line Drawing
6-28	Video Interface, Signal Flow Diagram	11 x 17	Line Drawing
6-29	VME, Signal Flow Diagram	11 x 17	Line Drawing
6-30	Control Function, Signal Flow Diagram	11 x 17	Line Drawing
6-31	Test Function, Signal Flow Diagram	11 x 17 (2 sh)	Line Drawing
6-32	NTDS Interface, Signal Flow Diagram	11 x 17	Line Drawing
6-33	FDDI Interface, Signal Flow Diagram	11 x 17	Line Drawing
6-34	Power Distribution, Summary Block Diagram	11 x 17 (2 sh)	Line Drawing
6-35	AC Power Distribution Diagram	11 x 17 (3 sh)	Line Drawing

FIGURE NO.	TITLE	APPROX. SIZE	TYPE OF ILLUS.
6-36	System Power Control*	11 x 17 (3 sh)	Line Drawing
6-37	DC Power Distribution Diagram	11 x 17 (2 sh)	Line Drawing
6-38	System Interconnecting Cabling Diagram*	11 x 17 (2 sh)	Line Drawing
6-39	Processor Unit 101, Schematic Diagram*	11 x 17 (5 sh)	Schematic
6-40	Video Interface, Schematic Diagram*	11 x 17 (23 sh)	Schematic
6-41	Receiver Interface, Schematic Diagram*	11 x 17 (14 sh)	Schematic
6-42	General Interface, Schematic Diagram*	11 x 17 (3 sh)	Schematic
6-43	Trigger Generator, Schematic Diagram*	11 x 17 (15 sh)	Schematic
6-44	Beacon Video Generator, Schematic Diagram*	11 x 17 (4 sh)	Schematic
6-45	Transmitter Unit 102, Schematic Diagram*	11 x 17 (4 sh)	Schematic
6-46	Transmitter Interface/BIT, Schematic Diagram*	11 x 17 (3 sh)	Schematic
6-47	Receiver/Exciter Unit 103, Schematic Diagram*	11 x 17 (8 sh)	Schematic
6-48	Direct Digital Synthesizer, Schematic Diagram*	11 x 17 (3 sh)	Schematic
6-49	Synchronizer/Baseband Generator, Schematic Diagram*	11 x 17 (4 sh)	Schematic
6-50	Processor Interface, Schematic Diagram*	11 x 17 (8 sh)	Schematic
6-51	Interface/BIT, Schematic Diagram*	11 x 17 (8 sh)	Schematic
6-52	Combiner/Transmit Test Target Generator, Schematic Diagram*	11 x 17 (3 sh)	Schematic
6-53	Transmit/Test Target Modulator, Schematic Diagram*	11 x 17 (3 sh)	Schematic
6-54	Beacon Receiver, Schematic Diagram*	11 x 17 (4 sh)	Schematic
6-55	Surface Receiver/A to D Converter, Schematic Diagram*	11 x 17 (8 sh)	Schematic

*Re-applied engineering drawing

FIGURE NO.	TITLE	APPROX. SIZE	TYPE OF ILLUS.
6-56	Local Oscillator Distribution, Schematic Diagram*	11 x 17	Schematic
6-57	Air Receiver/A to D Converter, Schematic Diagram*	11 x 17	Schematic
6-58	Power Supply Assembly, Schematic Diagram*	11 x 17 (3 sh)	Schematic
6-59	RF Distribution, Schematic Diagram*	11 x 17	Schematic
6-60	Antenna Unit 104, Schematic Diagram*	11 x 17 (3 sh)	Schematic
6-61	Pedestal Electronics, Schematic Diagram*	11 x 17 (5 sh)	Schematic
6-62	Junction Box Assembly, Schematic Diagram*	11 x 17	Schematic
6-63	Radar Set Control Unit 106, Schematic Diagram*	11 x 17	Schematic
6-64	Motor Generator Unit 107, Schematic Diagram*	8-1/2 x 11	Schematic
7-1	Radar Set AN/SPQ-9B, Pictorial	8-1/2 x 11	Line Drawing
7-2	Processor AN/XXX-9B	8-1/2 x 11 (3 sh)	Exploded View
7-3	Card Rack Assembly	8-1/2 x 11	Line Drawing
7-4	Tape Deck	8-1/2 x 11	Line Drawing
7-5	Fan Assembly	8-1/2 x 11	Line Drawing
7-6	Rectifier Assembly	8-1/2 x 11	Line Drawing
7-7	Synchro Assembly	8-1/2 x 11	Line Drawing
7-8	Transmitter AN/XXX-9B	8-1/2 x 11 (3 sh)	Exploded View
7-9	Card Rack Assembly	8-1/2 x 11	Line Drawing
7-10	Transmitter/Frame Assembly	8-1/2 x 11	Line Drawing
7-11	Power Supply	8-1/2 x 11	Line Drawing
7-12	Servo Amplifier	8-1/2 x 11	Line Drawing
7-13	Circuit Breaker Panel	8-1/2 x 11	Line Drawing
7-14	Receiver/Exciter AN/XXX-9B	8-1/2 x 11 (3 sh)	Exploded View
7-15	Direct Digital Synthesizer Module	8-1/2 x 11	Line Drawing
7-16	Combiner and Xmtr/Tgt Sel. Assembly	8-1/2 x 11	Line Drawing
7-17	Transmit/Test Target Modulator	8-1/2 x 11 (2 sh)	Line Drawing
7-18	Beacon Receiver Module	8-1/2 x 11	Line Drawing
7-19	Surface Receiver/ADC Assy	8-1/2 x 11 (2 sh)	Line Drawing
7-20	LO Distribution Assembly	8-1/2 x 11	Line Drawing
7-21	Air/Aux Receiver/ADC Assy	8-1/2 x 11 (2 sh)	Line Drawing
7-22	Power Supply Assembly	8-1/2 x 11	Line Drawing

*Re-applied engineering drawing

FIGURE NO.	TITLE	APPROX. SIZE	TYPE OF ILLUS.
7-23	RF Distribution Assembly	8-1/2 x 11	Line Drawing
7-24	Card Rack Assembly	8-1/2 x 11	Line Drawing
7-25	Antenna AN/XXX-9B, Pictorial	8-1/2 x 11 (3 sh)	Exploded View
7-26	Synchro Housing Assy, 2X-36X	8-1/2 x 11	Exploded View
7-27	Azimuth Drive Gear Box	8-1/2 x 11	Exploded View
7-28	Azimuth Data Gear Box	8-1/2 x 11	Exploded View
7-29	Antenna Assembly	8-1/2 x 11	Exploded View
7-30	Pedestal Subassembly	8-1/2 x 11 (2 sh)	Exploded View
7-31	Roll Gear Box Assembly	8-1/2 x 11	Exploded View
7-32	Pitch Gear Box Assembly	8-1/2 x 11	Exploded View
7-33	Brake and Tach Assembly	8-1/2 x 11	Exploded View
7-34	Stow Pin Assembly	8-1/2 x 11	Line Drawing
7-35	Junction Box Assembly	8-1/2 x 11	Line Drawing
7-36	Pedestal Electronics	8-1/2 x 11	Line Drawing
7-37	Bearing Plate Assembly	8-1/2 x 11	Exploded View
7-38	Radome AN/XXX-9B, Pictorial	8-1/2 x 11	Line Drawing
7-39	Radar Set Control AN/XXX-9B	8-1/2 x 11 (2 sh)	Exploded View
7-40	Motor-Generator AN/XXX-9B, Pictorial	8-1/2 x 11	Line Drawing
8-1	Unpacking Below Deck Equipment	11 x 17	Line Drawing
8-2	Unpacking Antenna/Pedestal	11 x 17 (2 sh)	Line Drawing
8-3	Unpacking Radome	11 x 17	Line Drawing
8-4	Processor Unit 101 Outline and Installation Diagram*	11 x 17	Line Drawing
8-5	Transmitter Unit 102 Outline and Installation Diagram*	11 x 17	Line Drawing
8-6	Receiver-Exciter Unit 103 Outline and Installation Diagram*	11 x 17	Line Drawing
8-7	Radar Set Control Unit 106 Outline and Installation Diagram*	8-1/2 x 11	Line Drawing
8-8	Motor Generator Unit 107 Outline and Installation Diagram*	8-1/2 x 11	Line Drawing
8-9	Antenna Assembly, Part of Unit 104, Outline and Installation Diagram*	11 x 17	Line Drawing
8-10	Pedestal, Part of Unit 104, Outline and Installation Diagram*	11 x 17 (2 sh)	Line Drawing
8-11	Radome, Unit 105, Outline and Installation Diagram*	11 x 17	Line Drawing
8-12	Interconnection Cabling Diagram*	11 x 17 (2 sh)	Line Drawing
8-13	Air Pressurization Diagram*	11 x 17	Line Drawing
8-14	Waveguide Connection Diagram*	11 x 17	Line Drawing

*Re-applied engineering drawing

APPENDIX B

SAMPLES

SAMPLE COVER PAGE

SE200-AG-MMO-010

TECHNICAL MANUAL

MAINTENANCE MANUAL

RADAR SET AN/SPQ-9B

CHAPTER 1 – INTRODUCTION

CHAPTER 2 – DESCRIPTION

CHAPTER 3 – OPERATION

CHAPTER 4 – SCHEDULED MAINTENANCE

CHAPTER 5 – CORRECTIVE MAINTENANCE

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Original.....0 15 October 1994

TOTAL NUMBER OF PAGES IN THIS VOLUME IS 218, CONSISTING OF THE FOLLOWING:

Page No.	*Change No.	Page No.	*Change No.
Title.....	0	2-1 - 2-32.....	0
A	0	3-1 - 3-32.....	0
i - xxviii.....	0	4-1	0
1-1 - 1-13.....	0	4-2 blank	0
1-14 blank	0	5-1 - 5-108.....	0

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RECORD OF CHANGES

CHANGE NO.	DATE	TITLE OR BRIEF DESCRIPTION	ENTERED BY

FOREWORD

This Functionally Oriented Maintenance Manual (FOMM) differs from conventional technical manuals in two areas: data arrangement, and method of presentation. The FOMM is divided into two volumes. Data required to install, operate, and understand the general operational theory of the AN/SPS-67(V)3 Radar, and to provide preventive maintenance and parts information, is included in Volume 1, the Support Volume. Information required to troubleshoot and repair the radar is included in Volume 2, the Troubleshooting/Repair Volume. This arrangement enables the qualified technician to isolate and correct any radar failure without being encumbered by information needed for other purposes. Volume 1 is arranged in sections similar to a conventional technical manual. Volume 2, however, is functionally arranged in information packages, rather than by chapters or sections. There are three information package levels, as follows:

1. The overall functional data package (Volume 2, Part 1). This package contains all diagrams that show the major functions of the radar set with interconnecting signals. Fault isolation is accomplished by using built-in test (BIT) features. The automatic and manual BIT tests are documented in a Fault Dictionary (Volume 2, Part 4) for use by the technician when performing fault isolation.
2. The major function data packages (Volume 2, Parts 1, 2 and 5). There is a data package for each radar set major function. Each package contains the diagrams that show BIT test points and interconnections between modules and units located in the function. The diagrams are referenced in the Fault Dictionary for use to locate faults not isolated by BIT, such as interconnecting wiring, etc.
3. The hardware data packages (Volume 2, Part 3). Each unit has a hardware data package, arranged in reference designator sequence for easy data access. Each package contains the schematic diagram, repair data, and parts location data required to correct a failure isolated to that piece of hardware without a reference to other parts of the manual. Module repair data is included for modules designated for shipboard repair only. Data for other modules is limited to a schematic diagram and keyed text.

FOMM data presentation methods make it easier to find information and learn about the equipment. For example, shades of blue and grey are used on functional diagrams. Grey shades indicate different levels of equipment hardware (units, assemblies, subassemblies). Blue shaded boxes visually group components that work together to perform a basic function. A circled number (key) in the upper-left corner of each blue box refers to a numbered text paragraph (keyed text) on a facing page. The text describes the functional operation of the circuit identified by the key number. Troubleshooting information is provided by a Fault Dictionary which directs the technician to a defective module located by built-in test (BIT).

The following chart illustrates the normal troubleshooting flow through the FOMM information package levels.

Troubleshooting of the AN/SPS-67(V)3 starts with the Fault Dictionary Volume 2 Part 4. The Fault Dictionary includes all automatic and manual tests required to fault isolate to a four Standard Electronic Module (SEM) or module level. The automatic BIT will indicate that a fault is present. Next by referring to the Fault Dictionary and using the manual BIT mode, the fault is isolated to a group of SEMs or a module.

TABLE OF CONTENTS

Chapter

Page

	FOREWORD	xxi
1	GENERAL INFORMATION	1-1
	1.1 Introduction	1-1
	1.1.1 Purpose	1-1
	1.1.2 Scope	1-1
	1.1.3 Evaluation and Reporting	1-1
	1.2 Equipment Description	1-1
	1.2.1 Intended Use	1-1
	1.2.2 Physical Description	1-1
	1.3 Reference Data	1-5
	1.3.2 Relationship of Units	1-5
	1.3.3 Equipment Supplied	1-6
	1.3.4 Equipment Required but not Supplied	1-6
	1.3.5 Field Changes, Modification Workorder Alterations	1-6
2	OPERATION	2-1
	2.1 General	2-1
	2.2 Operator Data Tables	2-1
	2.3 Operating Procedures	2-1
	2.3.1 Operator Turn-On	2-1
	2.3.2 Modes of Operation	2-2
	2.3.3 Special Operating Features	2-2
	2.3.4 Operation Under Interfering Conditions	2-4
	2.3.5 Operator Turn-Off	2-4
	2.3.6 Emergency (Battle Short) Conditions	2-4
	2.3.7 Operator Turn-On/Checkout Procedure	2-6
	2.4 Operator Maintenance	2-6
3	THEORY OF OPERATION	3-1
	3.1 Introduction	3-1
	3.1.1 Scope	3-1
	3.1.2 Mission and General Background Theory	3-1
	3.1.5 Moving Target Indicator (MTI)	3-1
	3.1.8 Automatic Target Detection and Track (ATDT)	3-2
	3.2 Operation of the AN/SPS-67(V)3 Radar Set	3-3
	3.2.2 Power Distribution	3-3
	3.2.3 Timing and Synchronization	3-3
	3.2.4 Serial Data Link	3-5
	3.2.5 Transmit	3-8
	3.2.6 Receive	3-15
	3.2.7 External Displays	3-19
	3.2.8 Built-In-Test (BIT)	3-19
	3.2.9 DMTI Function	3-20

LIST OF ILLUSTRATIONS

Figure	Title	Page
1-1	Relationship of Units	1-2
1-2	Radar Set Control, Unit 1	1-3
1-3	Receiver-Transmitter, Unit 2	1-3
1-4	Video Processor, Unit 3	1-4
1-5	Antenna Controller, Unit 4	1-5
1-6	Antenna Safety Switch, Unit 5	1-5
1-7	Antenna Group, Unit 6	1-6
1-8	Signal Processor, Unit 8	1-6
2-1	Radar Set Control Unit 1 Front Panel	2-5
2-2	VP Control Panel, 3A9	2-11
2-3	VP Maintenance Control Panel, 3A8	2-17
2-4	Antenna Controller Unit 4 Front Panel	2-18
2-5	Antenna Safety Switch Unit 5	2-20
2-6	SP Maintenance Control Panel, 8A2A48	2-21
2-7	Signal Processor Input Power and Control Assembly	2-25
2-8	Turn-On/Checkout Chart	2-26
3-1	Timing Function Block Diagram	3-4
3-2	Serial Data Link Block Diagram	3-6
3-3	Transmitter Block Diagram	3-9
3-4	Storage Network Charge Cycle Block Diagram	3-9
3-5	Storage Network Discharge (PFN Charge) Cycle Block Diagram	3-10
3-6	PFN Discharge Block Diagram	3-11
3-7	Transmitter Timing Diagram	3-11
3-8	Transmitter Timing Expanded	3-12
3-9	Transmitter Modulator Partial Schematic Diagram	3-13
3-10	VCS and IS Block Diagram	3-17
3-11	Mean Value Calculator Block Diagram	3-18
3-12	Built-In-Test (BIT) Block Diagram	3-21
3-13	AN/SPS-67(V)3 MTI Block Diagram	3-22
3-14	AN/SPS-67(V)3 Adaptive Video processor Block Diagram	3-24
3-15	AN/SPS-67(V)3 Signal Processor Centroider Functional Block Diagram	3-30
5-1	Installation Material	5-16
5-2	Radar Set Control, Unit 1, Outline Drawing	5-20
5-3	Receiver/Transmitter, Unit 2, Outline Drawing	5-24
5-4	Video Processor, Unit 3, Outline Drawing	5-29
5-5	Antenna Controller, Unit 4, Outline Drawing	5-34
5-6	Antenna Safety Switch, Unit 5, Outline Drawing	5-38
5-7	Antenna Group, Unit 6, Outline Drawing	5-40
5-8	Signal Processor, Unit 8, Outline Drawing	5-42
5-9	Radar Set Interface Block Diagram	5-47
5-10	Waveguide Connection Diagram	5-49
5-11	Cable Running Sheets	5-51
5-12	Installation Standards Summary Sheet	5-108

LIST OF TABLES

Table	Title	Page
1-1	Radar Set, Capabilities and Limitations	1-7
1-2	Equipment, Accessories, and Documents Supplied	1-11
1-3	Equipment and Publications Required But Not Supplied	1-13
1-4	Field Changes and Factory Changes	1-13
2-1	Radar Set Control, Operator Data Table	2-6
2-2	VP Control Panel, Operator Data Table	2-11
2-3	VP Maintenance Control Panel, Operator Data Table	2-17
2-4	Antenna Controller Operator Data Table	2-19
2-5	Antenna Safety Switch, Operator Data Table	2-20
2-6	SP Maintenance Control Panel, Operator Data Table	2-21
2-7	SP Input Power and Control Assy, Operator Data Table	2-25
2-8	AN/SPS-67(V)3 Mode Table	2-32
3-1	Transmitter Timing and Pulse Amplitudes	3-12
5-1	East/West Distance Examples	5-6
5-2	North/South Distance Examples	5-7
6-1	Radar Set AN/SPS-67(V)3, List of Major Units	6-1
6-2	Radar Set AN/SPS-67(V)3, Parts List	6-3
6-3	Radar Set AN/SPS-67(V)3, List of Attaching Hardware	6-425
6-4	Radar Set AN/SPS-67(V)3, List of Manufacturers	6-432
8-1	Dependency Definitions	8-21
8-2	Fault Dictionary	8-25
8-3	Radar Fault – System Fault Lamp Not Lit	8-71
8-4	Serial Link Failure – Test Numbers 35, 36	8-72
8-5	Switches/Controls Tests	8-73
8-6	High Reflected Power – Test Number 143	8-76
8-7	Power Supply Current Inhibit. Test Number 141 or Inverse Overvoltage Inhibit – Test Number 142	8-77
8-8	Low Incident Power – Test Number 169	8-88
8-9	Lamp Test	8-112
8-10	Frequency Meter Failure	8-114
8-11	True and Relative Bearing Failure	8-115
8-12	Trigger Output Tests	8-116
8-13	SP BIT/FIT Tests	8-117
8-14	Standard Switch Settings	8-120
8-15	SP Go/No Go End-to-End Test Procedure	8-121
8-16	SP MIL-STD-1397 Interface External WAT Procedure	8-123
8-17	SP MIL-STD-1397 Interface Troubleshooting Procedure	8-123
8-18	SP Test Panel (Normal Channel) Test Procedure	8-126
8-19	SP Automatic Isolation Troubleshooting Procedure	8-127
8-20	SP Power Fault Troubleshooting Procedure	8-135
8-21	SP Test Panel Troubleshooting Procedure	8-136

SAFETY SUMMARY

The following are general safety precautions that are not related to any specific procedures and therefore do not appear elsewhere in this publication. These are recommended precautions that personnel must understand and apply during many phases of operation and maintenance.

KEEP AWAY FROM LIVE CIRCUITS

Operating and maintenance personnel must at all times observe all safety regulations. Do not replace components when the power is turned on. Under certain conditions, 115 Vac is present when the power switch is off. Dangerous potential may exist when the power switch is off, due to the charge retained by certain capacitors. To avoid casualties, remove the input power plug and ground each circuit before touching it.

DO NOT SERVICE OR ADJUST ALONE

Certain adjustments must be made with the equipment open and power applied. For such events, use extreme caution to avoid contacting dangerous voltages. Under no circumstances should any person reach into or enter the enclosure for the purpose of servicing or adjusting the equipment except in the presence of someone who is capable of rendering aid.

RESUSCITATION

Personnel working with or near high voltages should be familiar with modern methods of resuscitation. Such information may be obtained from the Bureau of Medicine and Surgery.

WARNING

ELECTROMAGNETIC RADIATION. DO NOT STAND IN THE DIRECT PATH OF THE ANTENNA WHEN THE POWER IS ON! DO NOT WORK ON THE WAVEGUIDE WHILE THE POWER IS ON!

CAUTION

Certain equipments described in this manual contain devices that are sensitive to electrostatic discharge (ESD). Use ESD protective procedures when touching, removing or inserting.

WARNING

When access door and panels are opened and interlock switches manually closed for testing, dangerous voltages will be exposed in the area. Make all test connections with power off and stand clear when safety interlocks are cheated. Observe procedures described in page 5-13.

WARNING

Remove High Voltage Power Supply fuse 2A3F1 when performing magnetron filament voltage adjustment procedure, page 5-22.

CHAPTER 2 DESCRIPTION

2.1 PHYSICAL DESCRIPTION.

The following paragraphs describe significant physical features of the units comprising Radar Set AN/SPQ-9B. Arrangement of assemblies and subassemblies within each unit are described with reference to appropriate illustrations.

2.1.1 Processor. Processor, Figure 2-1, is a bulkhead-mounted aluminum enclosure which houses six major subassemblies and cabinet-mounted components. The major subassemblies are: card rack assembly A1; control display panel A2; Input/Output (I/O) adapter modules A3 and A4; and externally-accessible synchro junction box A5 and filter assembly A6. Cabinet-mounted components include: elapsed time meter M1, power supply PS1, and a group of door-mounted switches located above the control display panel. A hinged, removable door mounts the control display panel and an externally serviceable air intake filter. Access to internal Line Replaceable Units (LRU's) is gained from the front of the cabinet. A quick release latch handle at the left edge of the door enables rapid access to the cabinet interior. A locking stay secures the door open in the service position. The door opens to card rack assembly A1, enabling direct access to the majority of LRU's for maintenance purposes. In addition, the card rack assembly can be extended via slides, and rotated by a pivot mechanism to access additional replaceable LRU's. The card rack self-locks in the extended position and is secured by captive hardware in the closed position. Power and I/O signal cable entry is made via connectors on the right side of the cabinet. The synchro junction box also on the right exterior, provides maximum noise immunity. A wire rope isolation system, external to the cabinet, is provided to attenuate shock inputs. Four removable lifting eyebolts are stowed on the bulk-head interface bracket at bottom rear of cabinet.

2.1.1.1 Card Rack Assembly. Card rack assembly A1 Figure 2-1, consists of: tape deck A1A1; fan trays A1A2 and A1A3; four 21-slot card racks A1A4/5 and A1A7/8; power supply rack A1A6; rectifier A1A9; and cabinet exhaust fan assembly A1A10. The tape deck is located above top card rack A1A4 and houses an 8-millimeter (MM) internal tape drive. The cabinet door opens to access the tape deck. Each fan tray mounts two 28 Vdc blowers. Fan tray A1A2 is located above the power supply rack and fan tray A1A3 is located at the bottom of the card rack assembly. Forced air convection brings in air through the front door intake filter. Fan tray blowers draw the cooler air up through the card racks and toward cabinet fan assembly A1A10 which exhausts the

heated air out the rear of the enclosure. The complement of Circuit Card Assemblies (CCAs) and power supply modules in racks A1A4 through A1A7 are listed in Table 2-1. Card rack A1A8 consists of reserved spares and spare slots. Commercial Off-The-Shelf (COTS) items are identified in the table.

2.1.1.2 Control Display Panel. Control display panel A2 Figure 2-1), is a sealed infrared touch input system which provides consistent visibility under varying light conditions. The panel which can be positioned for internal or external viewing when the door is open or closed, is used to select various menus and operational modes of the radar. Power requirements for the panel are provided by power supply PS1, mounted on the cabinet door.

2.1.2 Transmitter. Transmitter, Figure 2-2, is a bulkhead-mounted aluminum enclosure which houses major subassemblies and cabinet-mounted components in two compartments. The upper compartment includes power distribution/controls, circuit breaker panel A8 and power supply A7. The lower compartment houses slide-mounted transmitter/frame assembly A2, card rack A1, power supplies A3, A4 and A5 and waveguide components. An Electromagnetic Interference (EMI)/Radio Frequency Interference (RFI) barrier separates upper and lower compartments. Cabinet-mounted components include: fan B1, fan sensor A10, relays/contactors and RF switch S1. For maintenance accessibility servo amplifier A6 is mounted on the right exterior and pressure control assembly A9 and dummy load are mounted on the left exterior of the cabinet. A group of six status indicators that monitor main power, motor generator, transmitter high/low power, processor and receiver-exciter are mounted along top edge of cabinet above the circuit breaker panel. A hinged, removable door secures an external serviceable air intake filter. Access to internal LRU's is gained from the front of the cabinet. Quick-release latch handle at left edge of door enables rapid access for LRU replacement and a locking stay secures door in service position. Power and I/O signal entry cable entry is made via connectors on left side of cabinet. A wire rope isolation system, external to the cabinet, is provided to attenuate shock inputs. Four removable lifting eyebolts are stowed within the cabinet.

2.1.2.1 Card Rack Assembly. Horizontally-mounted card rack assembly A1 (Figure 2-2), is the standard VME type and houses interface/BIT CCA A101 and antenna stabilization

Table 3-2. Radar Set Control, Operator Controls and Indicators

Index No.	Ref. Des.	Panel Name	Type of Control/ Indicator	Position	Function
1	R2	SCREEN BRIGHTNESS	Potentiometer	HIGH	Selects high intensity brightness for touch screen panel.
				LOW	Selects low intensity brightness for touch screen panel
2	DS1	SYSTEM ALARM	LED	n/a	
3	R3	PANEL DIMMER	Potentiometer	n/a	Controls intensity of edgelit panel lamps and status LEDs.
4	DS2	RSC ENABLED	LED	n/a	Lights ____ when radar can be controlled from RSC panel.
5	S1	BATTLE SHORT	Toggle switch	Up	Enables continued radar operation during certain emergency situations but with degraded performance.
6	DS3	BATTLE SHORT	LED	n/a	Lights ____ when radar is operating in battle short.
7	S2	ANTENNA SCAN	Toggle switch	OFF	Antenna is not rotating.
				ON	Enables antenna scan when R/F switch is set to ANTENNA position.
8	DS4	ANTENNA SCAN ON	LED	n/a	Lights ____ when antenna is rotating.
9	S3	R/F SWITCH	Toggle switch	ANTENNA	Enables transmit signal to be radiated via antenna.
				DUMMY LOAD	Sends transmitter output into dummy load.
10	DS5	DUMMY LOAD	LED	n/a	Lights ____ when RF signal is output to dummy load.
11	DS6	PRESTANDBY	LED	n/a	Lights ____ when radar is in prestandby mode.
12	DS7	STANDBY	LED	n/a	Lights ____ when radar is in standby mode.
13	S4	RADAR STATE	Rotary switch	OFF	Radar is not operating.
				STANDBY	Places radar in standby mode.

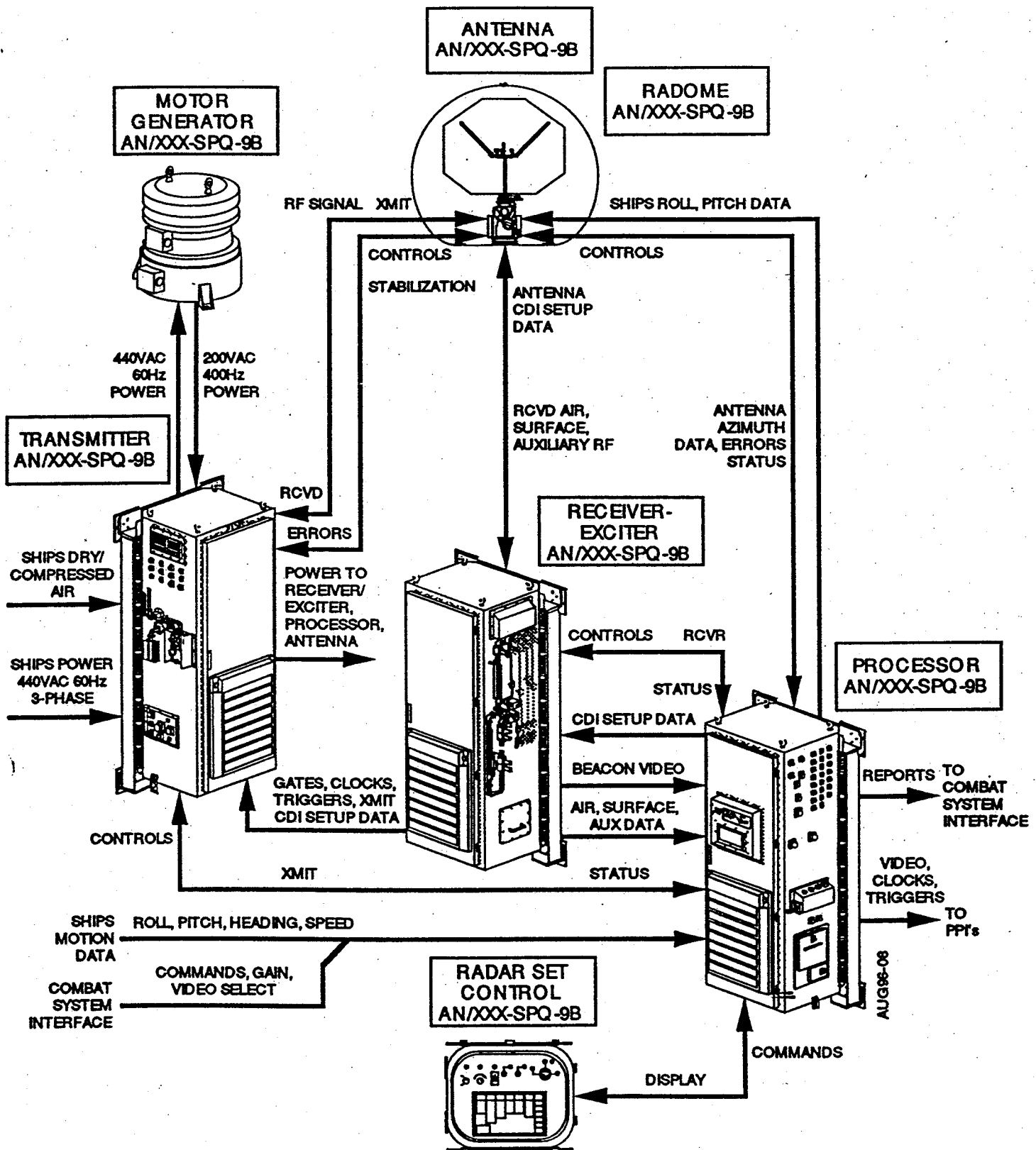


Figure 2-1. Sample Line Art

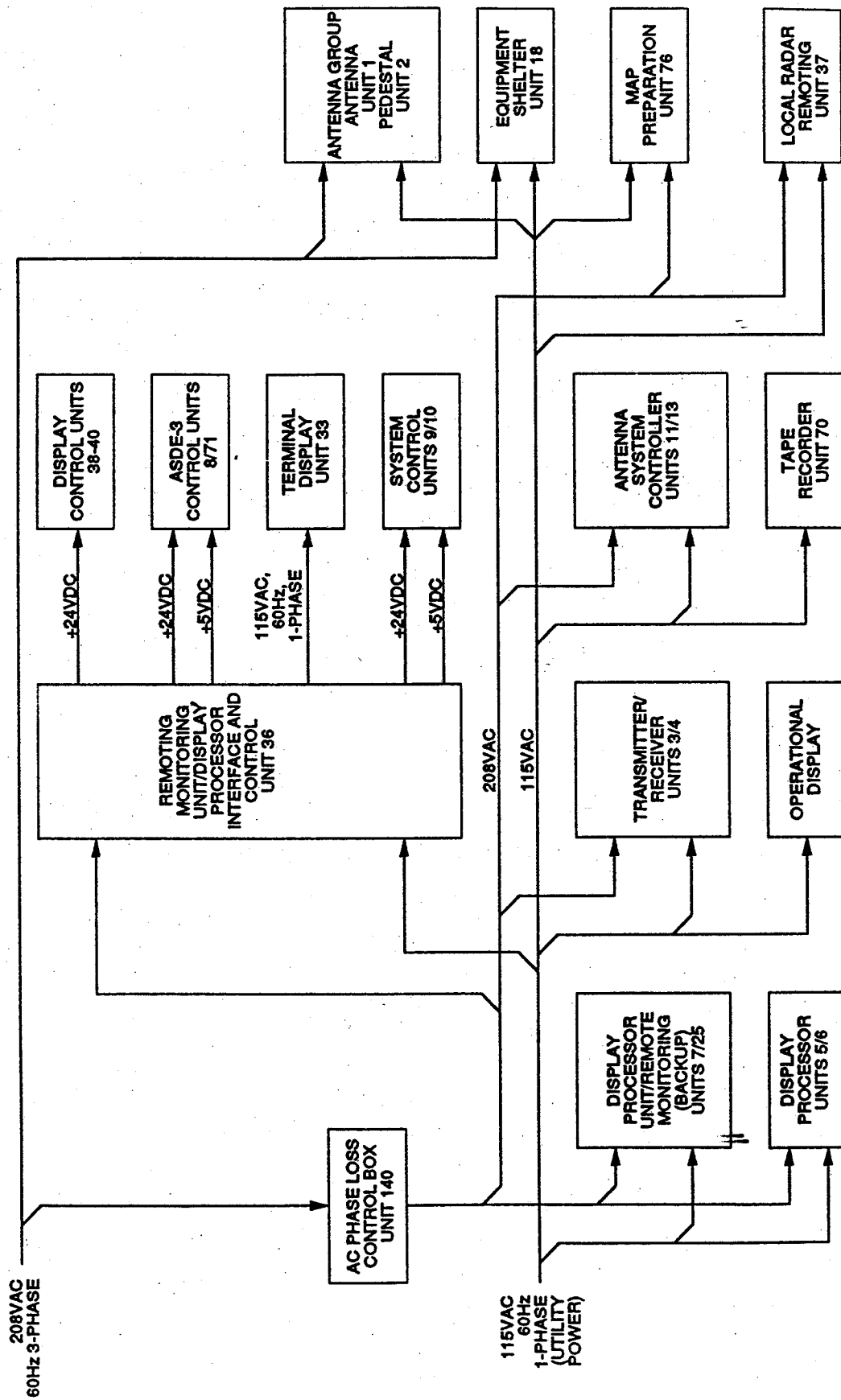


Figure 2-2. Sample Block Diagram

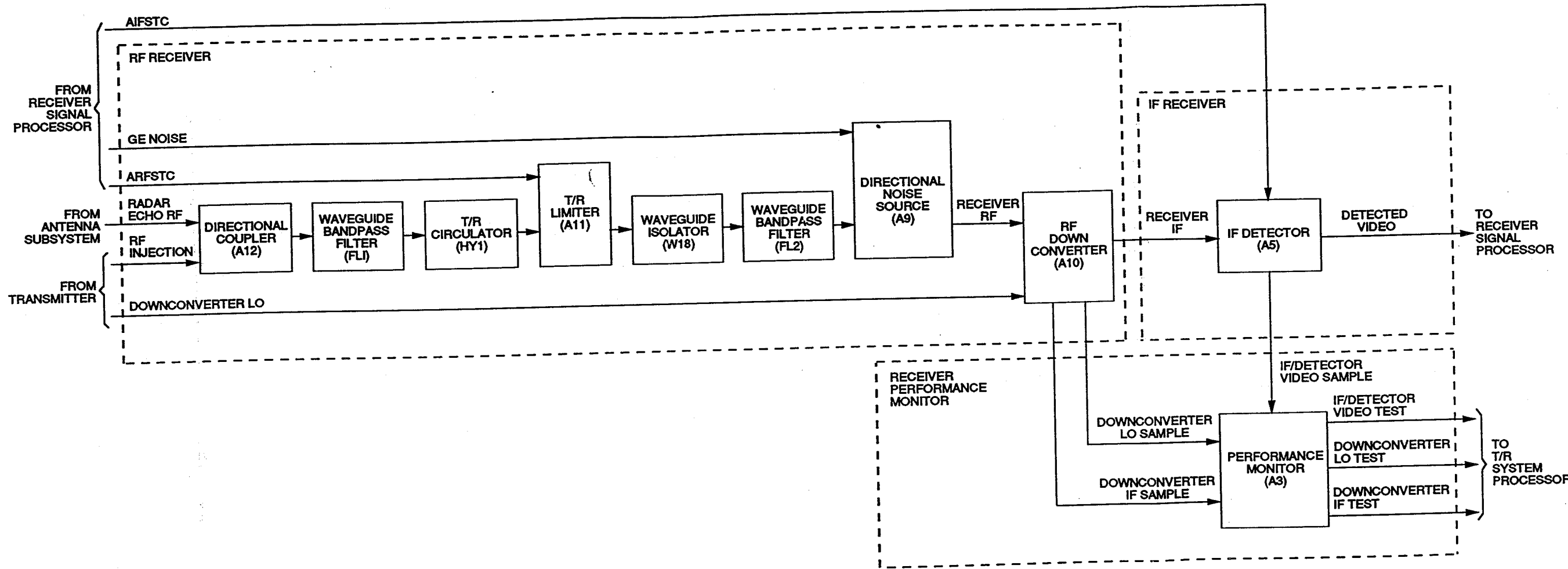


Figure 2-3. Sample Functional Block Diagram

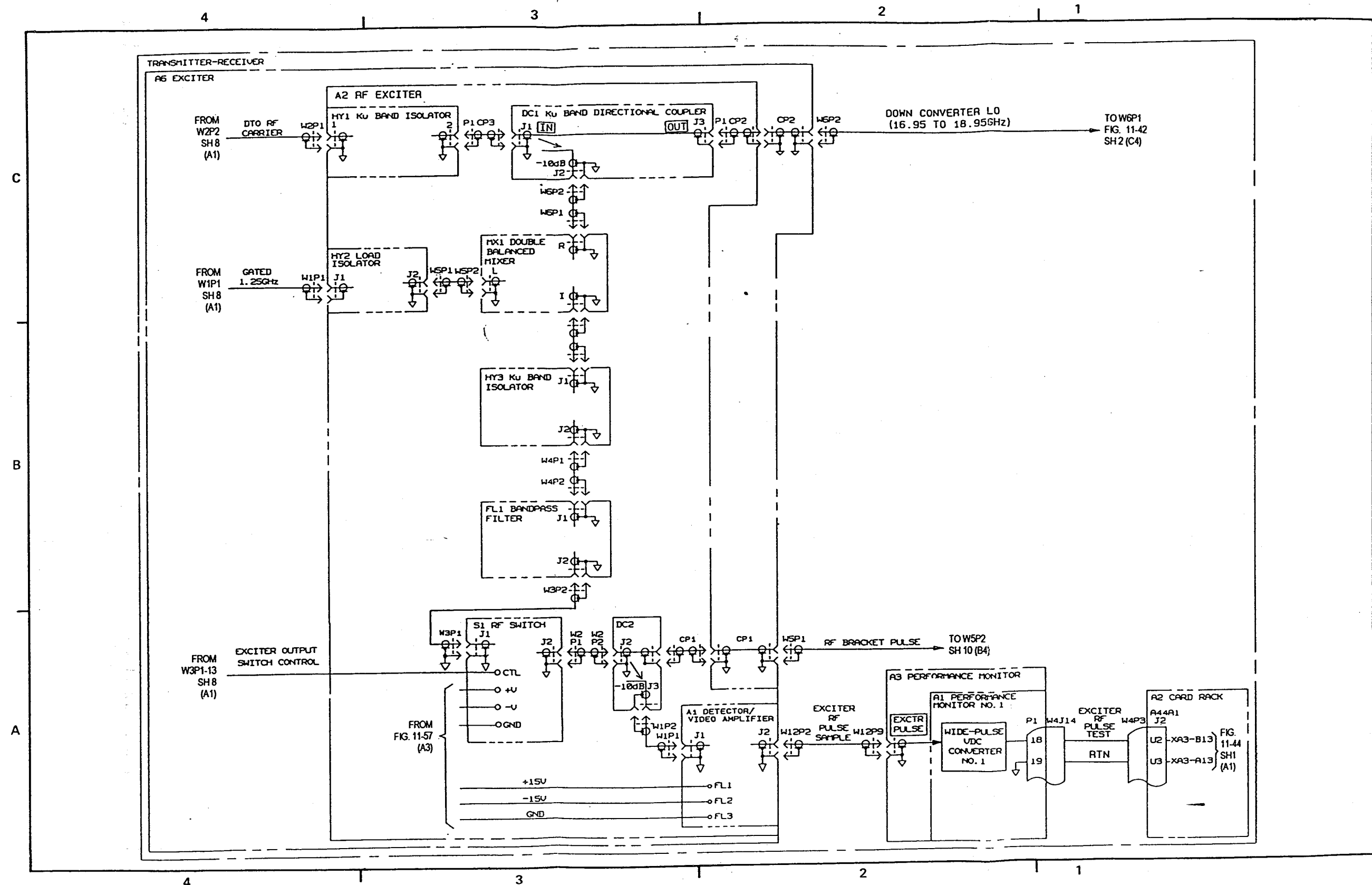
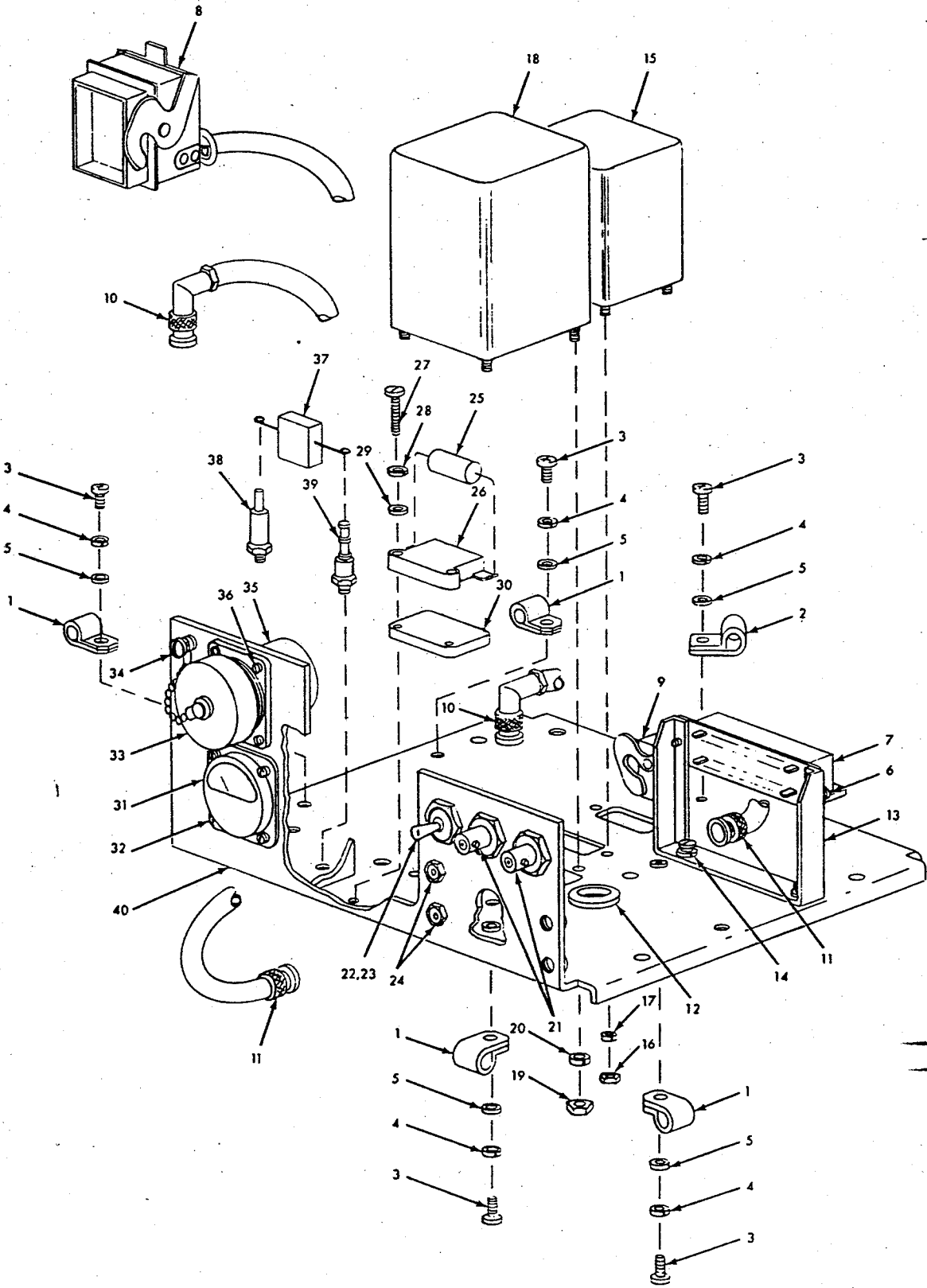


Figure 2-4. Sample Signal Flow Diagram

BREAKDOWN & INDEX NUMBER	PART NUMBER	1 2 3 4 5 6 7 8 DESCRIPTION	QTY PER ASSY	USABLE ON CODE
11 -	1999510	CHASSIS, ELECTRICAL EQUIPMENT /LD494559/	REF	
- 1	1132996-4	/SEE FIGURE 8-36 FOR NHA/		
- 2	1132996-5	. CLAMP, LOOP	4	
- 3	MS51957-30	. CLAMP, LOOP	1	
- 4	MS35338-136	. SCREW, MACHINE, PNH, CROSS-RECESSED DR, . . .	5	
- 5	MS15795-806	NO. 6-32 BY 1/2 IN. LG /AP/		
- 6	1999827	. WASHER, LOCK, NO. 6 /AP/	5	
- 7	MS51957-13	. WASHER, FLAT, NO. 6 /AP/	5	
- 8	MS35338-135	. WIRING HARNESS, BRANCHED /LD494643/	1	
- 9	1991141-32	/PARTIAL BREAKDOWN FOLLOWS/		
- 10	2026782-355	. SCREW, MACHINE, PNH, CROSS-RECESSED DR, . . .	2	
- 11	2026782-351	NO. 4-40 BY 1/4 IN. LG /AP/		
- 12	3202134	. WASHER, LOCK, NO. 4 /AP/	2	
- 13	M39012-16-0002	. CONNECTOR, RECEPTACLE, ELECTRICAL	1	
- 14	MS35489-45	. CONNECTOR, RECEPTACLE, ELECTRICAL	1	
- 15	1649015	. CONNECTOR, RECEPTACLE, ELECTRICAL	1	
- 16	MS51957-45	. CONNECTOR, PLUG, ELECTRICAL	2	
- 17	MS35338-138	. CONNECTOR, PLUG, ELECTRICAL	2	
- 18	MS15795-807	. GROMMET, RUBBER	1	
- 19	2812301-1	. BRACKET	1	
- 20	MS35649-264	. SCREW, MACHINE, PNH, CROSS-RECESSED DR, . . .	2	
- 21	MS35338-136	NO. 8-32 BY 1/2 IN. LG /AP/		
- 22	2678619	. WASHER, LOCK, NO. 10 /AP/	2	
- 23	MS35649-284	. WASHER, FLAT, NO. 8 /AP/	2	
- 24	MS35338-137	. TRANSFORMER, POWER, STEP DOWN	1	
- 25	M39012-24-0001	. NUT, PLAIN, HEX., NO. 6-32 /AP/	4	
- 26	1769576	. WASHER, LOCK, NO. 6 /AP/	4	
- 27	MS25081C4	. TRANSFORMER, POWER, STEPDOWN	1	
- 28	M39024-10-01	. NUT, PLAIN, HEX., NO. 8-32 /AP/	4	
- 29	RBR52S30R00FR	. WASHER, LOCK, NO. 8 /AP/	4	
- 30	CM45BK331JN3	. CONNECTOR, RECEPTACLE, ELECTRICAL	2	
- 31	MS51957-34	. SWITCH, TOGGLE, SPST.	1	
- 32	MS35338-136	. WASHER, KEY	1	
- 33	MS15795-806	. JACK, TIP, WHITE	2	
- 34	1769497-1	. RESISTOR, FIXED, WIRE WOUND, 30 OHMS PORM . .	1	
- 35	MR13S050DCUAR	1 PCT, 1/2 W		
- 36	MS51957-8	. CAPACITOR, FIXED, MICA, 330 PF PORM 5	1	
- 37	MS35338-134	PCT, 2500 VDCW		
- 38	2051703	. SCREW, MACHINE, PNH, CROSS-RECESSED DR, . . .	2	
- 39	MS51957-28	NO. 6-32 BY 1 IN. LG /AP/		
- 40	1999511	. WASHER, LOCK, NO. 6 /AP/	2	
		. WASHER, FLAT, NO. 6 /AP/	2	
		. INSULATOR	1	
		. METER	1	
		. SCREW, MACHINE, PNH, CROSS-RECESSED DR, . . .	4	
		NO. 2-56 BY 5/8 IN. LG /AP/		
		. WASHER, LOCK, NO. 2 /AP/	4	
		. CAP AND CHAIN	1	
		. SCREW, MACHINE, PNH, CROSS-RECESSED DR, . . .	1	
		NO. 6-32 BY 3/8 IN. LG /AP/		
		. WASHER, LOCK, NO. 6 /AP/	1	
		. WASHER, FLAT, NO. 6 /AP/	1	
		. CONNECTOR, RECEPTACLE, ELECTRICAL	1	
		. SCREW, MACHINE, FLH, CROSS-RECESSED DR, . . .	4	
		NO. 6-32 BY 3/8 IN. LG /AP/		
		. CAPACITOR, FIXED, MICA, 0.01 UF PORM 5	1	
		PCT, 300 VDCW		
		. TERMINAL, GROUND	1	
		. TERMINAL, STUD	1	
		. CHASSIS /MARKED/	1	



PART NUMBER	BREAKDOWN & INDEX #	REFERENCE DESIGNATION	PART NUMBER	BREAKDOWN & INDEX #	REFERENCE DESIGNATION
1N2993B	18-009-008	21A10VR1		14-061-004	18PS15CR19
		21A10VR3			18PS10CR9
1N3000B	07-023-023	10A21VR5			18PS10CR19
	08-063-006	11A31VR1			18PS11CR9
1N3001B	08-056-011	11A30VR6			18PS11CR19
1N3015B	09-023-033	12A9VR5			18PS12CR9
		12A10VR5			18PS12CR19
1N3016B	07-012-012	10A9VR3			18PS13CR9
	09-023-025	12A9VR2			18PS13CR19
		12A10VR2			18PS14CR9
1N3017B	22-003-002	31A1VR1			18PS14CR19
1N3020B	08-027-004	11A6VR5		14-065-024	18VR2A1VR1
	09-014-020	12A5CR13			18VR2A2VR1
1N3022B	07-021-019	10A20VR3	1N3026B	06-029-010	6A6VR1
	08-067-022	11A32VR3		16-005-001	20VR1
	09-009-029	12A1VR4	1N3027B	04-018-014	4A1A1VR1
	14-034-001	18A46VR2			4A1A1VR2
1N3023	08-016-016	11A5VR1 THRU VR3			17A10A1VR1
1N3024	07-009-029	10A33VR2		14-053-004	17A10A1VR2
		10A33VR3			18PS2CR9
1N3024B	07-021-004	10A20VR1	1N3029B	15-014-017	18PS2CR19
		10A20VR2		20-004-021	19A7VR2
	08-038-020	11A19VR2	1N3030B	07-016-020	23A3VR5
	09-014-001	12A5VR1			10A14VR5
	14-032-025	18A42VR1			10A15VR5
		18A42VR2			15A2VR5
		18A43VR1		15-018-001	23A2VR5
		18A43VR2	1N3031B	14-067-027	19VR52
		18A44VR1			18VR5A1VR1
		18A44VR2			18VR5A2VR1
		18A45VR1			18VR6A1VR1
		18A45VR2			18VR6A2VR1
	14-034-028	18A46VR4			18VR15A1VR1
		18A46VR5			18VR15A2VR1
	14-045-011	18A60CR3			18VR16A1VR1
1N3025B	08-027-011	11A6VR3	1N3032B	14-063-026	18VR16A2VR1
	08-068-034	11A32VR5			18VR1A1VR1
	14-045-028	18A60CR2			18VR1A2VR1
	14-049-004	18PS1CR9			18VR4A1VR1
		18PS1CR19			18VR4A2VR1
		18PS4CR9			18VR7A1VR1
		18PS4CR19			18VR7A2VR1
		18PS7CR9			18VR8A1VR1
		18PS7CR19			18VR8A2VR1
		18PS8CR9			18VR9A1VR1
		18PS8CR19			18VR9A2VR1
		18PS9CR9			18VR10A2VR1
		18PS9CR19			18VR11A2VR1
	14-057-004	18PS5CR9			18VR12A2VR1
		18PS5CR19			18VR13A2VR1
		18PS6CR9	1N3033B	07-018-025	18VR14A2VR1
		18PS6CR19	1N3034B	14-070-026	10A16VR5
		18PS15CR9			18VR10A1VR1
					18VR11A1VR1

REFERENCE DESIGNATION	BREKDOWN & INDEX NUMBER	PART NUMBER	REFERENCE DESIGNATION	BREKDOWN & INDEX NUMBER	PART NUMBER
1A	1 - 3	2885100	12A1K23	114 - 46	2486683
1AA2	1 - 3F	2885010	12A1K5 THRU	114 - 46	2486683
1AA3	1 - 3A	2885009	12A1K11	114 - 46	2486683
1AA3F1, 1AA3F2	1 - 3B	FM01-125V4A	12A1K27	114 - 34	RV6LAYS A255B
1AA3F3 THRU	1 - 3C	FM01-125V1 1-2A	12A1K40	114 - 35	RV6LAYS A503A
1AA3F5	1 - 3C	FM01-125V1 1-2A	12A1S1 THRU	114 - 32	MS24523-21
1B	1 - 4	1445020	12A1S10	114 - 32	MS24523-21
10	1 - 6	2812285	12A1S11	114 - 33	MS24524-23
10S1	4 - 4	2642232-1	12A1XK16	114 - 47	2520575
11	1 - 13	1995625	12A1XK22	114 - 47	2520575
11B3	56 - 9	1999624	12A1XK23	114 - 47	2520575
12	1 - 20	2520521	12A1XK5 THRU	114 - 47	2520575
12AT1	113 - 157	MX554AU	12A1XK11	114 - 47	2520575
12A1	113 - 1	2486638	12A1Z1	114 - 57	2625004
12A1A1	114 - 38	2486580	12A1Z1R1	114 - 59	RCR20G152KR
12A1A2	114 - 39	2486583	12A1Z1R2	114 - 60	RCR20G102KR
12A1A3CR1 THRU	114 - 11	1N483B	12A1Z1R3	114 - 61	RCR20G682KR
12A1A3CR69	114 - 11	1N483B	12A2	113 - 2	2486672
12A1A3CR71 THRU	114 - 11	1N483B	12A3	113 - 3	2520526
12A1A3CR244	114 - 11	1N483B	12A3A1	116 - 13	2486666-2
12A1A3CR246 THRU	114 - 11	1N483B	12A3DL1	116 - 32	2520609
12A1A3CR264	114 - 11	1N483B	12A3J1	116 - 19	MS3122E14-19P
12A1A3CR267 THRU	114 - 11	1N483B	12A3J2 THRU	116 - 31	M39012-23-00C1
12A1A3CR364	114 - 11	1N483B	12A3J4	116 - 31	M39012-23-00C1
12A1A3CR366 THRU	114 - 11	1N483B	12A3J5	116 - 10	MS24055-1
12A1A3CR420	114 - 11	1N483B	12A3J6	116 - 31	M39012-23-0001
12A1A3CR423 THRU	114 - 11	1N483B	12A3P1, 12A3P2	116 - 7	M39012-16-0002
12A1A3CR430	114 - 11	1N483B	12A3Z1	116 - 20	2486664
12A1A3CR432 THRU	114 - 11	1N483B	12A3Z1C1	116 - 24	M39003-01-23C6
12A1A3CR439 THRU	114 - 11	1N483B	12A3Z1C2	116 - 22	M39003-01-2356
12A1A3CR437	114 - 11	1N483B	12A3Z1C3	116 - 22	M39003-01-2356
12A1A3CR481	114 - 11	1N483B	12A3Z1Q1	116 - 28	2N706
12A1A3DS1 THRU	114 - 5	MS25237-327	12A3Z1R1	116 - 23	RCR20G102KR
12A1A3DS60	114 - 5	MS25237-327	12A3Z1R2	116 - 27	RCR20G152KR
12A1A3XDS1 THRU	114 - 6	2520590	12A3Z1R3	116 - 26	RCR20G222KR
12A1A3XDS60	114 - 6	2520590	12A3Z1R4	116 - 25	RCR20G101KR
12A1J1	114 - 41	MS3122E22-55PX	12A3Z1T B1	116 - 30	2486663
12A1J2	114 - 42	MS3122E20-41P	12A4	113 - 4	2486659
12A1K16	114 - 46	2486683	12A4A1	117 - 29	2486574
12A1K22	114 - 46	2486683	12A4A2	117 - 30	2486577

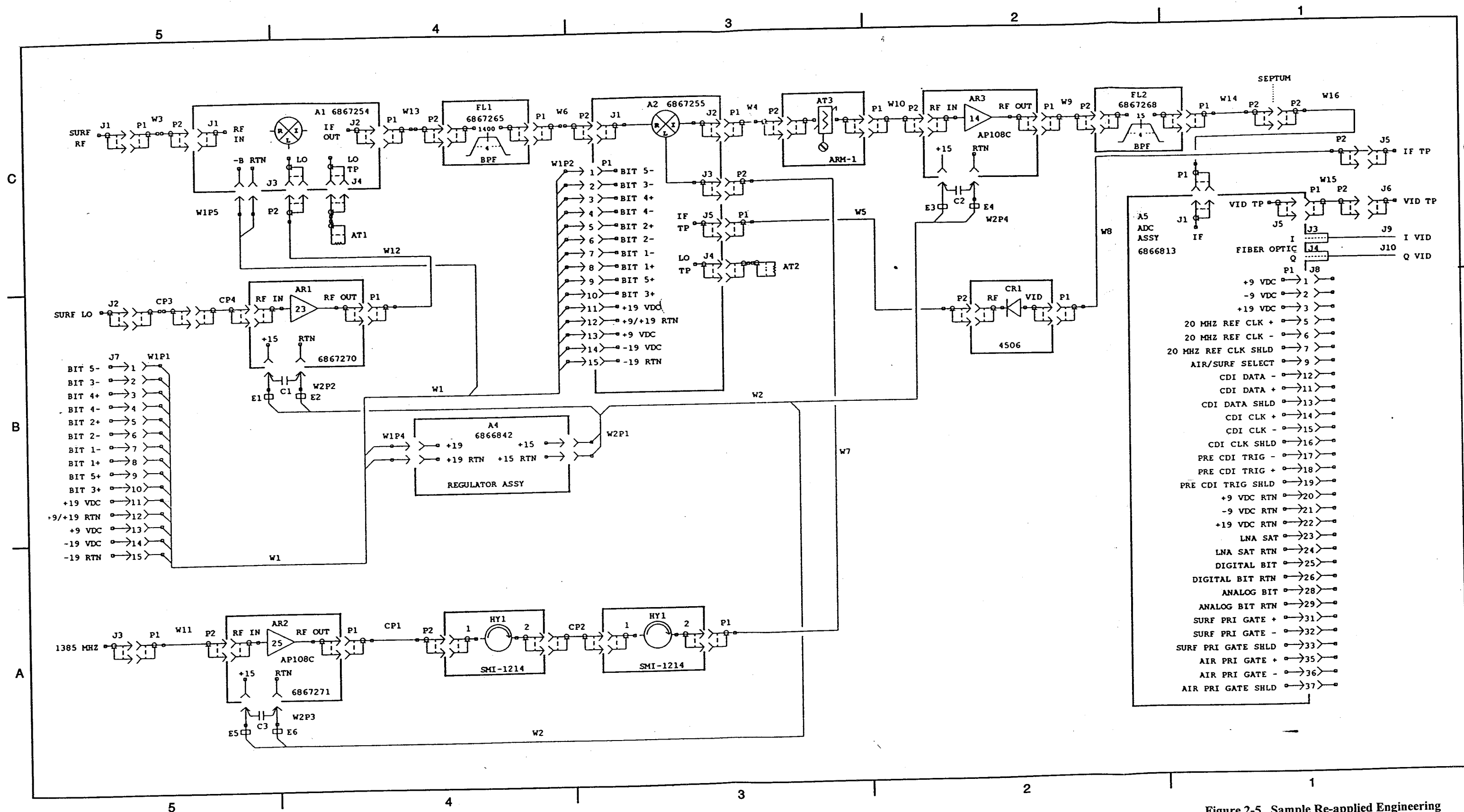


Figure 2-5. Sample Re-applied Engineering Drawing

APPENDIX C

TABLE PLAN

This table plan lists the proposed tables to be included in the AN/SPQ-9B technical manual. Table number, title and a brief description are included.

TABLE NO.	TITLE	DESCRIPTION	EST. NO. OF PAGES
1-1	Radar Set AN/SPQ-9B Characteristics	Operating/technical characteristics and capabilities.	5
1-2	Reference Data	Major units, official nomenclature/common names, reference designations.	1
1-3	Reference Publications	Documents relating to Radar Set AN/SPQ-9B, ancillary and support equipment.	1
1-4	Acronyms and Abbreviations	Will list and describe all acronyms/abbreviations used throughout technical manual.	2
2-1	Processor CCA/Power Supply Module Complement	Lists ref. des. and name of CCAs and power supplies within processor.	1
2-2	Receiver-Exciter CCA/Module Complement	Lists ref. des. and name of CCAs and modules within receiver-exciter.	1
3-1	RCP, Controls and Indicators	Function/type of controls and indicators, reference designations, panel names.	2
3-2	Radar Set Control, Controls and Indicators	Function/type of controls and indicators, reference designations, panel names.	2
3-3	RCP Main Menu, Controls and Indicators	Functions of RCP menu touch panel designations.	1/2
3-4	RSC Main Menu, Controls and Indicators	Functions of RSC menu touch panel designations.	1/2
3-5	System Setup Menu, Controls and Indicators	Functions of system setup menu touch panel designations	2
3-6	Turn-on Procedure	Step-by-step procedure sequencing through prestandby, standby, ready and radiate power conditions.	4
3-7	Ship Specific Data Entry Menu, Controls and Indicators	Functions of ship specific data entry touch panel buttons	1
3-8	On-Line BIT Menu, Controls and Indicators	Functions of on-line BIT touch panel buttons.	1
3-9	Training Target Scenario Menu, Controls and Indicators	Functions of target training scenario touch panel buttons.	1
3-10	Scenario Control Menu, Controls and Indicators	Functions of scenario control touch panel buttons.	2
3-11	Operate Menu, Controls and Indicators	Functions of operate touch panel buttons.	1
3-12	Video Control Menu, Controls and Indicators	Functions of video control touch panel buttons.	1

TABLE NO.	TITLE	DESCRIPTION	EST. NO. OF PAGES
3-13	Radar Control Menu, Controls and Indicators	Functions of radar control touch panel buttons.	1
3-14	MTI and Blank Sector Definition Menus, Controls and Indicators	Functions of MTI and blank sector definition touch panel buttons.	1
3-15	ASMD Sector Definition Menu, Controls and Indicators	Functions of ASMD sector definition touch panel buttons.	1
3-16	Radar Data Menu, Controls and Indicators	Functions of radar data touch panel buttons.	1
3-17	Beacon Control Menu, Controls and Indicators	Functions of beacon control touch panel buttons.	1
5-1	Table of Established Values	Will identify equipment parameters whose center values have long-term stability requirements. Space will be provided for "write-in" entries of actual values.	1
5-2	Adjustment Effectivity List	Cross-reference relating adjustment/alignment procedures to output functions.	1
5-3	List of Adjustment Procedures	Listed by functional group; include ref. des., name of control, references figure showing control.	1
5-4	Interchangeable CCAs/Modules	Listed by ref. des.; name/part no. of CCA/module.	1
6-1	Troubleshooting Index	Alphabetical listing of each output function, reference to signal flow/power distribution diagram.	2
6-2	Transmitter Panel, Controls and Indicators	Function/type of controls and indicators, reference designations, panel names.	2
6-3	Maintenance Turn-On Procedure	Expands upon turn-on procedure (table-1-9) to ensure radar meets operability requirements, references troubleshooting diagrams.	4
6-4	Relay Index	Alphabetical listing by ref. des.; followed by functional bus and coil supply voltage; — reference to troubleshooting diagram showing relay in energized condition.	2
6-5	Switch Index	Alphabetical listing by ref. des. Followed by switch bus and voltage; reference to troubleshooting diagram.	3

TABLE NO.	TITLE	DESCRIPTION	EST. NO. OF PAGES
6-6	Lamp Index	Alphabetical listing by ref. des. followed by lamp name and bus voltage; reference to troubleshooting diagram which shows lamp voltage.	3
6-7	BIT Main Menu, Controls and Indicators	Functions of BIT main menu touch panel buttons.	1
6-8	System Fault Details Menu, Controls and Indicators	Functions of system fault details touch panel buttons.	1
6-9	BIT Fault Insertion/Isolation Menu, Controls and Indicators	Functions of BIT fault insertion/isolation touch panel buttons.	1
6-10	Data Extraction Menu, Controls and Indicators	Functions of data extraction touch panel desig.	1
6-11	Signal Processor DX Options Menu, Controls and Indicators	Functions of signal processor DX options touch panel desig.	1
6-12	Select Processors Menu, Controls and Indicators	Functions of signal processor menu touch panel desig.	1
6-13	Processor DX Event Select, Controls and Indicators	Functions of processor DX event select touch panel desig.	1
7-1	Manufacturers Code and Names	Cross references five digit number to manufacturers name and address.	2
7-2	Usable on Codes	Lists codes used to define part variations used within equipment.	1
8-1	Inspection Data	Lists items to be checked for damage, inspections to be made, disposition of damaged material.	2
8-2	Cable Run Sheets	Lists function, cable type/designation from/to data, wire gauge.	60
9-1	Classified Radar Parameters	Provides listing of classified radar data.	1